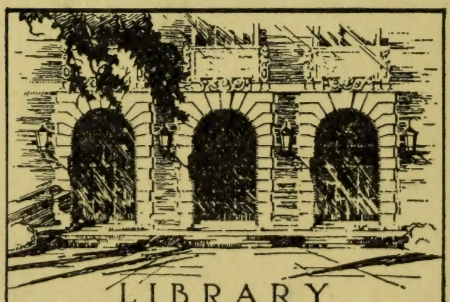
ACES LIBRARY

LIBRARY OF
Illinois State
LABORATORY OF NATURAL HISTORY,
URBANA, ILLINOIS.

ACES LIBRARY



LIBRARY
OF THE
UNIVERSITY
OF ILLINOIS
506
SOU
v.17-19
cop.3
BIOLOGY
AUG 31 1948

Return this book on or before the
Latest Date stamped below.

University of Illinois Library

NOV 18 1958
FEB 27 1967

SEP 19 1907

L161—H41

2
6

TRANSACTIONS AND PROCEEDINGS

AND

REPORT

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XVII.

For 1892-93.

EDITED BY PROFESSOR RALPH TATE.

[With Ten Plates.]

Adelaide:
W. C. RIGBY, 74, KING WILLIAM STREET.

DECEMBER, 1893.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

Royal Society of South Australia.

Patron:

HER MAJESTY THE QUEEN.

Vice-Patron:

HIS EXCELLENCY THE EARL OF KINTORE, K.C.M.G., &c.

OFFICERS.

[Elected October 17, 1893.]

President:

PROFESSOR R. TATE, F.G.S., F.L.S.

(Representative Governor.)

Vice-Presidents:

REV. THOS. BLACKBURN, B.A.

MAURICE HOLTZE, F.L.S.

Hon. Treasurer:

WALTER RUTT, C.E.

Hon. Secretaries:

W. L. CLELAND, M.B. | W. C. GRASBY.

Members of Council:

SAMUEL DIXON

WALTER HOWCHIN, F.G.S.

J. S. LLOYD

W. B. POOLE

PROFESSOR E. H. RENNIE, D.Sc., F.C.S.

E. C. STIRLING, C.M.G., M.D., M.A., F.R.S.

506
SOU
v.17-19
cop.3

ACES LIBRARY

CONTENTS.

PART I. (Issued June, 1893.)

PAGE.

LOWER, OSWALD B. : List of South Australian Rhopalocera ... 1
TEPPER, J. G. O. : The Flora of Roebuck Bay, West Australia ... 13
ETHERIDGE, R., JUN. : The "Mirrn Yong" Heaps at Nor'-West Bend, River Murray 21
TEPPER, J. G. O. : The Blattariæ of Australia and Polynesia ... 25
GOYDER, G. A. : On a New Mineral (Stibiotantalite) 127
TEPPER, J. G. O. : A New Parasite of the Black-scale 129
BLACKBURN, REV. T. : New Genera and Species of Australian Coleoptera (XIII.) 130
GROUVELLE, E. : Description of a New Genus and Five Species of Australian Nitidulidæ and Colydiidæ 141
LOWER, OSWALD B. : New Australian Lepidoptera 146
RENNIE, PROF. E. H., and TURNER, E. F. : Poisonous Constituents of *Stephania hernandifolia* 146
TATE, PROF. R. : New Species of Australian Marine Gastropoda ... 189
TATE, PROF. R. : Additions to the List of South Australian Marine Gastropoda 198
TATE, PROF. R., and DENNANT, J. : Correlation of Marine Tertiaries of Australia (Part I., Victoria) 203

PART II. (Issued December, 1893.)

STRETTON, W. G. : Aboriginal Tribes of the Gulf of Carpentaria ... 227
MACKILLOP, REV. D. : Aboriginal Tribes of the Daly-river ... 254
TEPPER, J. G. O. : South Australian Brachyscelid Galls 265
TEPPER, J. G. O. : Notes on South Australian Rhopalocera ... 281
LOWER, O. B. : New Australian Heterocera 287
BLACKBURN, REV. T. : New Genera and Species of Australian Coleoptera (XIV.) 294
TATE, PROF. R. : The Gastropods of the Older Tertiary of Australia (Part IV.) 316
HOWCHIN, WALTER : Tarkaninna and Mirrabuckinna Borings ... 346

Abstract of Proceedings 350
Annual Report 356
Balance-sheet 358
Donations to the Library 359
List of Fellows 366

APPENDICES.

Proceedings, Annual Report, and Balance-sheet of the Field Naturalists' Section 369
Annual Report and Balance-sheet of the Microscopical Section ... 373
Annual Report and Balance-sheet of the Astronomical Section ... 375

List of South Australian Rhopalocera.

By Oswald B. Lower, F.E.S.

[Read February 7, 1893.]

As some ten years have elapsed since the publication of Mr. Tepper's list of South Australian Rhopalocera (Trans. Roy. Soc. S.A., 1881), I have deemed it advisable to write the present paper, especially as the list has been considerably augmented by the addition of several interesting species hitherto unrecorded for this colony. It is usually considered, I believe, that the scarcity (?) of Rhopalocera in this colony is due to the great dryness during the season of flight; also the severe droughts we are subjected to, &c. But my honest conviction is that the scarcity is due to the want of systematic collecting. Unfortunately, we possess but very few energetic entomologists among our members, and until we have more workers must rest content with slow progress in this particular branch. It will be gratifying, however, to know that we have found several species new to the colony. In Tepper's list 27 species were said to occur here; in the present paper I am able to bring the total up to 40 species, chiefly through the diligent collecting of my two brothers—Messrs. Harold and Rupert Lower. I have excluded the doubtful species, a list of which will be found at the end of this paper. All the species have been taken within a radius of 30 miles of Adelaide, excepting the Port Lincoln species, and I have no doubt that when other districts are properly worked our list will be still further increased.

Papilio, *Linn.*

1. Pap. Erithonius, *Cram.*, var. Sthenelus, *McLeay.*

King's Survey Aust., II., p. 457, n. 133, 1827; *Tepp.*, Trans. Roy. Soc., S.A., for 1881.

Blackwood, Reedbeds, Macclesfield, in October and November; a scarce species; larvæ found at Brighton, feeding on *Psoralea adscendens*, in February.

Terias, *Swain.*

2. T. Smilax, *Don.*

Pap. S., Ins. N.H., t. 20, f. 3, 1805; *Tepp.*, Trans. Roy. Soc. S.A., for 1881.

Syn.—T. ingana, *Wall*, Tr. Ent. Soc., ser. iii.–iv., p. 332, n. 10, 1867; T. sinta, *Wall*, l.c., 1867.

Parkside, Belair, Blackwood, and Highbury, from November

to February. Most common in October, frequenting blossoms of Cape dandelion (*Cryptostemma calendulacea*), the colour of which agrees so well with the insects as to make it very difficult to discern them.

PIERIS, *Schr.*

3. P. TEUTONIA, *Fabr.*

Pap. T., Syst. Ent., p. 474, n. 137, 1775 ; *Tepp.*, Tr. Roy. Soc. S.A., for 1881.

Syn.—Pap. coronea, *Cram.*, Pap. Ex. 1, t. 68, B.C., 1779; female Pap. Deiopeia, *Don.*, Ins. N.H., t. 21, f. 2, 1805? P. Clytie, *Don.*, l.c., t. 19, f. 2, 1805 ; P. Niseia, *Macl.*, King's Surv. Aust., App. 459, n. 138, 1827.

Parkside, Blackwood, Waterfall Gully, &c.; also in the Botanic Gardens, Adelaide, frequenting *Capparis spinosa* in November, and again in March. On November 15, 1889, this species appeared in hundreds passing from south to north. The following day scarcely one was to be seen, nor have I observed them in such numbers since. Its proper food plant is *Capparis Mitchelli*, but we have reared specimens from the egg-stage by feeding with *C. spinosa.*

Egg.—Cylindrical, slightly narrowing at both ends, longitudinally grooved with 8 to 10 furrows. Colour, orange ; after the larva emerge the shell becomes pearly white. The eggs are deposited on the underside of the terminal leaves in clusters of from 15 to 26. The imago deposits them at the rate of about 13 a minute, and when examined they resemble miniature ninepins. They hatch nine days after being laid. Length, $1\frac{1}{4}$ mm.

Young larvæ (on emergence).—Dull orange-yellow, head and anal segment fuscous. All the segments are furnished with long hairs, being longest on anterior segment. The young larva on exclusion begin to feed voraciously on the shell of the egg, afterwards on the leaf of food plant. Length, 3 mm.

After First Moult.—Head black, body light-brown, thickly studded with golden yellow spots and whitish hairs, giving the caterpillar a very pretty appearance. Length, 9 mm.

After Second Moult.—No perceptible difference excepting that the colour of body is more whitish, and has a somewhat polished appearance. Length, 18 to 22 mm.

Larvæ Full Grown.—Head shining black, minutely dusted with yellowish and covered with rather long, erect whitish hairs. Body shining dark-brown, with a darker dorsal streak, minutely sprinkled with short erect hairs. Second and third segments with a collar of moderate-sized golden yellow spots placed anteriorly. Fourth and fifth similar. All other segments have six golden spots about same size as preceding, only instead of

being in the form of a collar are placed triangularly. Three placed each side of dorsal streak, two anteriorly, and one posteriorly ; anal segment blackish, with collar of similar spots, but rather larger than preceding, a moderate greenish lateral stripe above spiracles. Spiracles golden yellow, rather prominent. Belly and sides rather thickly studded with long white hairs. Colour of abdomen greenish yellow.

Chrysalis.—Sordid ochreous-white, the colours of imago showing through the transparent skin, especially so in the male. Head case pointed and rugose. Thoracic region strongly elevated into a roughened ridge, bearing at the junction of abdomen two spines acutely produced. Abdomen sprinkled with blackish, and each segment has a pointed protuberance, and on each side of this two small, whitish shining tubercles. Sides broadly white. Spiracles dull yellowish. The chrysalis is held in position by a fine white ligament fastened to the stem of plant. Average length of chrysalis, 15 mm. ; width, about 4 mm. The imago emerges eight days after transformation. The colour agreeing very well with the white flowers of food-plant.

Delias, *Hub.*

4. D. Aganippe, *Don.*

Pap. A., Inst. N.H., t. 29, 1805 ; *Tepp.* (Pier. Ag.), Tr. Roy. Soc., S.A., for 1881.

Parkside, Blackwood, Petersburg, Fullarton, Teatree Gully, and Highbury, from September to January ; feeds on *Loranthus linophyllus;* most common during January at Highbury. Mr. R. Lower took a specimen at Unley in June.

The female of this species is figured in Tepper's paper as *Delias (Pieris) Harpalyce*, Don., although the median discal dot is not shown. The fig., however, does *not* represent " Harpalyce."

Callidryas, *Bdi.*

6. C. pyranthe, *Linn.*

Pap. P., Syst. Nat. 1, p. 469, n. 66, 1758.

Syn.—Pap. Chryseis, *Dru.*, Ill. Ex. Ent. 1, t. 12, f. 3, 4, 1773 ; Pap. Gnome, *Fab.*, Syst. Ent. App., p. 808, 1775 ; P. Gnoma, *Fab.*, Syst. Ent. App., p. 828, n. 152, 153, 1776 ; P. Alcyone, *Cram.*, Pap. Ex. I., t. 58, A.-C., 1779 ; P. flavocinerascens, *Goeze*, Ent. Beyt.. III. I, p. 183, n. 86, 1779 ; P. Phillipina, *Cram.*, Pap. Ex. IV., t. 361, C.D., 1782 ; P. nephte, *Fab.*, Syst. Ent. III., 1, p. 190, n. 588, 1793 ; P. Ilea, *Fab.*, l.c., Supp., p. 426, 1798 ; P. Minna, *Herbst.*, Nat. Schm., V., t. 89, fig. 1, 2, 1792 ; C. Thiserilla, *Bdv.* (nec *Wall*), sp. gen. I., p. 609, n. 3, 1836 ; C. Evangelina, *Butl.*, Tr. Ent. Soc., p. 11, n. 6, 1870.

I have seen a specimen of this insect, taken by Mr. E. Guest at Balhannah. It was hovering over apple blossoms when discovered. It is a fairly common Queensland species, but hitherto unrecorded for South Australia.

Danais, *Latr.*

6. D. petilia, *Stoll.*

Pap. p., Supp. *Cramer's* Pap. Ex., p. 132, t. 28., f. 3, 1787-91.

Parkside, Waterfall Gully (rather common), Mount Gawler, Blackwood, &c., from November to May. Most common during April, but never very abundant.

Tepper calls this *D. Chrysippus*, Linn., in his list, a widely different species, and not known to occur in Australia.

D. Erippus, *Cramer.*

Pap. E., Pap. Ex., I., t. 3, A.B., 1775 ; *Guest*, Tr. Roy. Soc. S.A., vol. VIII., p. 61, 1886.

Syn.—D. plexippus, *Linn.* (Papilio), Mus. Ulr. p. 262, 1764 ; D. Archippus, *Linn.* (Papilio), Syst. Nat. 1, 2, p. 767, 1767 ; D. Archippe, *Godt.*, Enc. Meth., IX., p. 184, n. 28, 1819 ; Anosia megalippe, *Hb.*, Samml. Ex. Schm., 1806-24.

Waterfall Gully and Brighton, two specimens. This species is now very plentiful at Waterfall Gully, frequenting its food-plant (*Gomphocarpus fruticosus*) during April and May. The larva is too well-known to need description, but I may state, so far as my experience goes, the bred specimens cannot compare with those caught on the wing for size or colour. The species is greatly subjected to the attacks of a parasitic dipter (the name of which I have been unable to find). It is our finest species, sometimes measuring $5\frac{1}{2}$ inches in expanse.

Xenica, *Westw.*

8. X. achanta, *Don.*

Pap. A., Ins. N. H., A. 22, f. 2, 1805.

Syn.—Tisiphone Achanthe, *Hub.*, Zutr. Ex. Sch., f. 267, 268, 1823 ; Lasiomata ocrea, *Guest*, Tr. Roy. Soc. S.A., V., p. 35, 1882.

Common during December and January at Waterfall Gully ; also taken near Balhannah. Not mentioned in Tepper's 1881 list.

9. X. Klugii, *Guer.*

Sat. K., Voy. Coq., t. 17, fig. 2, 1829 ; *Tepp.*, Tr. Roy. Soc S.A., for 1881.

Syn.—Satyrus Singa, *Bdv.*, Voy. Astrol. Lep., p. 145, n. 3, 1832; Las. philerope (pars), *Westw.*, l.c. 19, 1851.

Blackwood, Waterfall Gully, Belair, &c.; most common at Belair during November and December.

HETERONYMPHA, *Wallen.*

10. HET. MEROPE, *Fab.*

Pap. M., Syst. Ent., p. 495, n. 228, 1775; *Tepp.*, Tr. Roy. Soc. S.A., for 1881.

Syn.—Oreas Nubila Œnomais, *Hb.*, Samm. Ex. Sch., I., t. 94, figs. 1-4, 1806; female, Pap. Themis, *Dalm.*, Anal. Ent., p. 42, n. 10, 1823; male, Sat. Archemor, *Godt.*, Enc. Meth., IX., p. 500, n. 82, 1819.

Woodside, Belair, Mount Gawler, Teatree Gully, Blackwood; common during November, December, and January. I have noticed that the male insects appear earlier than the female.

PYRAMEIS, *Hub.*

11. P. ITEA, *Fab.*

Pap. Itea, Syst. Ent., p. 498, n. 238, 1775; *Tepp.*, Tr. Roy. Soc., 1882.

Parkside, Blackwood, Yorketown, Mount Gawler, Belair, &c.; common September to March. Feeds on stinging nettle (*Urtica urens*). I have bred them from the chrysalis in November, and also in March, so that it would appear to have two broods during the year.

12. P. KERSHAWI, *McCoy.*

Cynthia K., Ann. N. H., ser. 4, I., p. 76, 1868; P. Cardin, *Tepp.*, Tr. Roy. Soc., for 1881.

Common at Parkside, Petersburg, Yorketown, Waterfalls, &c. I have bred this species in December, the chrysalis being found under *dry* clumps of cowdung. It is on the wing from August to May.

JUNONIA, *Hb.*

13. J. VELLIDA, *Fab.*

Pap. V., Mant. Ins., p. 35, n. 366, 1787; *Tepp.*, Tr. Roy. Soc., IV., 1882.

Common at Parkside, Woodside, Waterfall Gully, Belair, &c., from September to March, frequenting dry ground, especially those of a red-clay nature, the colour of which no doubt protects the species from observation. Sometimes they are very dwarfed in appearance. I have specimens less than one inch in expanse. In Tepper's list the name is incorrectly spelt as "Junonisa."

LUCIA, *Swain.*

14. LUCIA LUCANUS, *Fab.*

Hesp. L., Ent. Syst., III., 1, p. 322, n. 221, 1793.

Syn.—L. limbaria, *Swain* (nec Blanch), Zool. Ill. Ins., II., t 135, 1833; Chrysophanus discifer, *H. S.*, Stett. Ent. Ziet, p. 72, n. 21, t. 4, f. 21, 1869; *Tepp.* (Lycæna D.), Tr. Roy. Soc. S.A., IV., 1882.

As Miskin rightly points out, this species has been confused with *Chrysophanus aurifer*, Blanch, a very dissimilar species, and to my knowledge not taken here, although said to be, the mistake no doubt being caused by wrong identification.

Woodside, Black Forest (South-road), Parkside, &c., not common, frequents stinkwort (*Inula graveolens*) during October to May.

LAMPIDES, *Hub.*

15. L. BŒTICUS, *Linn.*

Pap. B., Syst. Nat., 12 ed., I., 2, p, 789, n. 226, 1767; *Tepp.* (Cupido B.), Trans. Roy. Soc., IV., 1882.

Syn.—Hesperia Bœtica, *Fab.*, Ent. Syst., III., 1, p. 280, n. 77, 1793; Pap. Colutheæ, *Fuess*, Schweiz. Ins., p. 31, n. 594, f. 2, 1775: Pap. Damœtes, *Fab.*, Syst. Ent., p. 526, n. 350, 1775; Pap. Damœtas, *Esper.*, Ges. Eur. Schm., t. 28, f. 1a, 16, t. 29, f. 1a 1b, 1806-18; Pap. pisorum, *Fourc.*, Ent. Paris, II., p. 242, n. 25, 1785; Pap. Archias, *Cram.*, Pap. Ex., II., t. 181, f.c. 1777.

A cosmopolitan sp. Parkside, Woodside, &c., &c. Common during December, November, to February.

LYCÆNA, *Fab.*

16. L. BIOCELLATA, *Feld.*

Reise Novara, Lep., II., p. 280, n. 352, t. 35, f. 14, 1869.

Syn.—Cupido adamapuncta, *Tepp.*, Tr. Roy. Soc. S.A., IV., 1882.

Parkside, Blackwood, Waterfall Gully, from August to February. Most common at Blackwood in August.

17. L. LABRADUS, *Godart.*

Poly. L., Enc., Meth., IX., p. 680, n. 197, 1819.

Syn.—Lyc. communis, *H. S.*, Stett. Ent. Zeit., p. 72, n. 36, 1869; Lyc. Alsulus, *H. S.*, l.c., 1869, p. 75; female, Poly. Diogenes, *Blanch*, Voy. Pole Sud., IV., Ins., p. 397, t. 3, f. 7-8, 1855; Lyc. Phœbe, *Murray*, Ent. Mo. Mag., X., p. 107, 1873; Cupido delicata, *Tepp.*, Tr. Roy. Soc. S.A., IV., p. 30, t. 2, f. 12, 1882; Lycæna pervulgatus, *Guest*, l.c., V., p. 36, 1882.

Common from December to March. Waterfall Gully, Woodside, Belair, Parkside, &c.

18. L. SERPENTATA, *H. S.*

Ent. Zeit., p. 74, p. 32, 1869.

Syn.—Cupido molybdena, *Guest*, Tr. Roy. Soc., S.A., IV., p. 36, 1882. C. fasciola, *Tepp.*, l.c., p. 30, t. 2, f. 13, 1883.

Waterfalls, Parkside, &c. Common. On the banks of the River Torrens (at the back of Police Barracks) we have taken this species in abundance during January and February, frequenting a weed.

19. L. AGRICOLA, *D. H.* and *W.*

Lucia A., Gen. D.L., II., p. 496, note t. 76, f. 4, 1850-2; *Tepp.*, Tr. Roy. Soc. S.A., IV., p. 29, t. 2, f. 8, 1882.

Belair and Blackwood, not uncommon during October and November.

HOLOCHILA, *Feld.*

20. H. HEATHI, *Cox.*

L. Heathi, Ent., IV., p. 402, 1873.

Syn.—Lyc. paradoxa, *Guest*, Trans. Roy. Soc. S.A., 1882.

Waterfalls, Belair, Blackwood, &c. October to January, most common at Belair in January; frequenting flowers of *Bursaria spinosa*, the colour of which agrees remarkably well with that of the insect, *i.e.*, the underside.

21. H. ERINUS, *Fab.*

Pap. E., Syst. Ent., p. 525, n. 348, 1775.

Syn.—H. anita, *Semp.*, Mus., Godf., Lep., XIV., p. 163, 1878; male, H. hyacinthus, *Sp.*, l.c. 162, 1878; Scott, Mss. Lyc. bimaculosa, *Leach*, Mss.; Cupido simplexa, *Tepp.*, Tr. Roy. Soc., S.A., 1881; Lyc. Mœrens, *Ros.*, Ann. *H. S.*, ser. 5, XVI., p. 377, 1885; Pol. subpallidus, *Lucas*, Pro. R. Soc. Q., VI., 1889.

Cherry Gardens, Woodside, Belair, Blackwood. September to February, very common at Blackwood in February.

Our species appear to be the var. (?) *Mœrens*, Rosen, but I think it is a good species, and not a variety.

HYPOCHRYSOPS, *Feld.*

22. HYP. IGNITA, *Leach.*

Lyc. I., Zool. Misc, I., p. 136, t. 60, fig. 1-3, 1814.

Port Lincoln and Blackwood. Very scarce, taken during November and December. Beaten from *Acacia pycnantha*,

which is in all probability its food plant; as an allied species *H. delicia*, Hew., feeds on "Blackwood" *(Acacia melanoxylon)*. This beautiful specimen has not been recorded previously for S.A.

Ialmenus, *Hub.*

23. I. Illidgei, *Lucas.*

Proc. Royal Soc. Queensland, p. 156, f. 1-2, 1889.

Parkside and Highbury. Common in larval state, but more scarce in the wing. Not previously taken here.

In Miskin's Catalogue for 1891 I notice that this species is quoted as synonymic with *ictinus*, Hew. Now, I am always amenable to reasonable queries, but I think Miskin goes a little too far. There is as much difference, if not more, between the two above-mentioned than between *Lyc. agricola*, D. H. and W., and *serpentata*, H. S. If they are the same as Miskin says, how is it that we do not get "ictinus" down here? And how is it that our larvæ are *green*, whilst the Brisbane and Victorian forms are *brown?* The typical "Illidgei" differs very little from our species, and is immediately recognisable by the absence of black markings on underside, which are so prominent in the true "ictinus." Larva full fed. Length, 26 mm. Moderately stout, tapering at both ends. Head small, shining black, with a few whitish scattered strigula. Body bright yellowish-green, sides more yellowish; second segment with two curiously raised wart-like protuberances of a dark crimson colour, which are thickly covered with moderately long hairs; third and fourth segments with somewhat similar protuberances, but not hairy, like second. Segments from seven to ten inclusive are marked with curious uninterrupted wedge-shaped spots on dorsum. On each side of these spots is a deep crimson blotch, corrugated at sides, the posterior portion being raised in the form of an erect projection—those on anal segment much larger—sparsely furnished with hairs. Spiracles ochreous-yellowish, margined with brown. Beneath each spiracle is a tuft of scattered hairs, generally about six. Anal segment is densely covered with short blackish hairs. Belly light green, sides densely clothed with short whitish hairs.

Chrysalis pitchy-black, shining. Abdominal segments marked with ochreous-yellow lines. A similar line placed dorsally from head to base of thorax, and continued round the wing-covers. Spiracles orange-yellow. Length, 13 to 15 mm. Feeds on *Acacia pycnantha*, the larva being covered with small ants. The chrysalis is usually found at the foot of the tree, and the perfect insect emerges in from six to nine days, males predominating.

24. I. inous, *Hew.*

Ill. D. L., p. 54, n. 3, t. 24, fig. 1-2, 1865.

Syn.—I. icilius, *Hew.*, l.c., fig. 3 ; Cupido æneus, *Tepp.*, Trans. R. Soc. S.A., IV., p. 29, t. 2, f. 9, 1882.

Parkside (rare), Blackwood, Highbury, Belair, &c., November to January. Most common at Belair in January.

Ogyris, *Westw.*

25. O. otanes, *Feld.*

Reise Nov. Lep., II., p. 217, n. 234, t. 28, f. 1-3, 1865 ; *Tepp.*, Tr. Roy. Soc. S.A., IV., p. 31, t. 2, f. 1, 1882 ; *Tepp.*, male, O. halmaturia, male, Nat. Ins. S.A., part II., p. 12, 1890.

Victor Harbor, Kangaroo Island, Yorketown. December to February. Most common at Yorketown (frequenting "Mallee," *E. oleosa*) in February. Miskin thought this might be a small form of "Genovera," *Hew.*, but this is wrong.

As will be noted above, the male is described as the male "halmaturia."

26. O. idmo, *Hew.*

Cat. Lyc., B. M., p. 2, n. 7, t. 1, f. 3, 4, 1850-52.

Syn.—Male, O. halmaturia, *Tepp.*, female, Nat. In. S.A., pt. II., p. 12, 1890,

Pt. Lincoln, two specimens, taken by the Rev. T. Blackburn, also at Kangaroo Island, where Mr. Tepper informs me it is common.

As will be seen above, the male of this species has been described as the female of *O. halmaturia*, Tepp., the description of which tallies exactly with *idmo*, so that Tepper's name must rank as synonymic.

27. O. orætes, *Hew.*

Female, Cat. Lyc., B. M., p. 3, n. 12, t. 1, f. 12, 13, 1862 ; male, *Tepp.* Tr. Royal Soc. S.A., 1886 (O. amaryllis).

Yorketown, Moonta, not uncommon, frequenting *Eucalyptus oleosa* in February. I once obtained during November at Belair chrysalides of this species under the bark of *Eucalyptus rostrata*, but was unable to rear them.

27. O. Amaryllis, *Hew.*

Female, Cat. Lyc., B. M., p. 3, n. 11, t. 1, f. 5, 6, 1862 ; *Tepper*, Tr. Roy. Soc. S.A., 1886 ; *Miskin*, male, Proc. Linn. Soc., N.S.W., 1890.

Five specimens from Yorketown ; frequents *Euc. oleosa.*

This and the previous species have been confused by Mr. Tepper in his paper of 1886 (Tr. Roy. Soc. S.A.) inasmuch that after quoting Hewitson's (Newman's ?) description of the female he proceeds and describes the male *orætes*, Hew., as the male of the present species. For further reference see Miskin's able paper in Linn. Soc. of N.S.W. Proc., ser. 2, V., p. 26, 1886.

28. O. OLANE, *Hew.*

Cat. Lyc., B. M., p. 2, n. 10, t. 1, fig. 10-11, 1862.

One male of this species was recently captured at Kent Town (near Smith's brewery) by my young friends the Messrs. Angel. Not previously recorded from here. Whilst writing on this genus, it may be interesting to state that the young larvæ are usually found covered with ants, which are said to feed on the sweet secretion which this (and other genera) usually emit. My valued correspondent, Mr. F. Spry, of Melbourne, is of opinion, however, that the ants use the bodies of the larva to clean themselves, like a doormat, as he puts it; this is more noticeable in one species, *i.e.*, *O. abrota*, which is covered with short stiff hairs, making his argument more conclusive. Another curious fact he mentions is that in breeding the different species the ants, when placed in confinement with the larvæ, rapidly die. One would think, however, that if the ants feed on the secretion emitted they could live as well confined as in natural conditions, but such it seems is not the case, so that it remains for those who have the opportunities to settle the question satisfactorily. I may mention that the above-named gentleman has bred several of the genus, and can speak with a certain amount of authority; and in concluding his remarks he mentions that the larvæ are greatly subject to the attacks of parasitic hymenoptera, diptera, and fungoid diseases, which no doubt accounts for their rarity; and states that some of the species use the empty gall-cases of diptera, &c., to live in. This is more noticeable when the eggs are laid on the close-barked *Eucalyptus melliodora*, as the larvæ, instead of wasting their energy by endeavouring to get under the tough bark, adapt themselves to circumstances, and take possession of the gall-chambers.

PAMPHILA.

29. P. GRACILIS, *Tepper.*

Hesperilla gracilis, Trans. Roy. Soc. S.A., IV., p. 34, t. 2, f. 7, 1882.

Six specimens taken in December at Henley Beach.

APAUSTUS, *Hb.*

30. AP. AGRAULIA, *Hew.*

Ancyloxypha agraulia, *Hew.*, Desc. Hesp., p. 45, n. 3, 1868.

Syn.—Pamphila sunias, *Feld.*, Sitzb. Ak. Wiss. Wien. Math. Nat. bl., XI., p. 462, n. 54, 1860.

Not previously recorded from South Australia. Slape's Gully, two specimens, and Botanic Gardens, Adelaide, in February and March; not uncommon frequenting blossoms of *Gomphrena*

officinalis (Globe Amaranth) and *Centranthus ruber*, flying swiftly in sunlight.

TRAPEZITES, *Hub.*

31. TRAP. PHILLYRA, *Miskin.*

Proc. Roy. Soc. Queensland, p. 152, 1889.

One fine specimen of this beautiful species at Blackwood in October, not previously recorded from South Australia.

32. TRAP. PHIGALIA, *Hew.*

Hesp. p, Desc. Hesp., p. 32, n. 23, 1868.

I have a specimen doubtfully referable to this species from Port Lincoln.

33. TRAPEZITES LUTEA, *Tepp.*

Hesperilla lutea, Tr. Royal Soc. S.A., IV., p. 33, t. 2, f. 6, 1882; Trap. petalia, *Misk.*, Ann. Q. Museum, I., 1891, p. 78.

Two specimens, Slape's Gully, in December.

Miskin in his 1891 catalogue makes this species synonymous with *T. petalia*, Hew., while Tepper himself considers his *Hesperilla quadrimaculata* identical with it (*i.e.*, petalia). I have received a specimen of a male "petalia" from Mr. R. Illidge, of Brisbane, which is certainly distinct from any taken here. My opinion is that Tepper's *Hesp. trimaculata* is the male of his *quadrimaculata*, but in the absence of proper literature I cannot decide the question satisfactorily. The whole of the Hesperidæ are in a very unsatisfactory condition, and when my promised literature is at hand, I will give my deliberations to our Society.

34. TRAP. TRIMACULATA, *Tepp.*

Hesperilla T., Trans. Roy. Soc. S.A., IV., p. 32, t. 2, f. 4, 1882.

Several specimens, *all males*, at Belair, frequently dry rocky ground in November.

35. TRAP. QUADRIMACULATA, *Tepp.*

Tr. Roy. Soc. S.A., IV., p. 32, t. 2, fig. 2, 1881.

Two *females* at Blackwood, 11th November, also from Balhannah. As before stated, I am of opinion that this and the preceding are sexes of the same species. Not having taken the opposite sex in either case seems more convincing.

HESPERILLA.

36. HESP. DONNYSA, *Hew.*

Male. Desc. *Hesp.*, p. 39, n. 3, 1868.

One sp., from Port Lincoln, in December. Not previously recorded from here.

37. Hesp. atralba, *Tepp.*

Trans. Roy. Soc. S.A., IV., p. 33, t. 2, f. 5, 1882.
One sp., from Port Lincoln (Rev. T. Blackburn).

38. Hesp. dactyliota, *Meyr.*

Telesto D., Tr. Linn. Soc. N.S.W., ser. 2, II., p. 831, 1888.
I have not seen this species. In the original description it is stated to occur at Port Lincoln and to be common in West Australia; but Mr. Meyrick writes that the species is unique in his collection.

Taractrocera, *Butler.*

39. T. bifasciata, *Tepp.*

Hesp. bifasciata, Tr. Roy. Soc. S.A., IV., p. 32, t. 2, f. 4, 1882; Tar. flavovittata, *Miskin*, Cat., 1891.
One sp., Lyndoch (*Tepper*). Miskin is under the impression that this is *T. flavovittata*, Satr., and as the type (*bifasciata*) is lost, the question must be left in abeyance for the present.

40. T. papyria, *Bdv.*

Hesp. p., Voy. Astr. Lep., p. 166, 1832.
Syn.—Hesperilla fumosa, *Guest*, Tr. Roy. Soc., S.A., V., 1882; Apaustus minimus, *Misk.*, Proc. R. Soc. Q., p. 153, 1889.
Parkside, Woodside, Balhannah, December to March, frequenting stinkwort (*Inula graveolens*).

The following are reputed South Australian species :—

41. Delias Harpalyce, *Don.*, Tepper's list.
42. " Argenthona, *Fab.*, Tepper's list.
43. Chrysophanus aurifer, *Blanch.*
44. Holochila acasta, *Cox.*
45. Ialmenus evagoras, *Don.**
46. Hesperilla Dirphia, *Hew.*
47. Taractrocera celœno, *Cox.*

Not having seen or taken specimens in South Australia, I omit them for the present.

---

* On reference to Tepper's Common Native Insects of S.A. part II., I find that his description applies to *inous*, Hew., so that *evagoras*, Don., can be struck off the list.

The Flora of Roebuck Bay, West Australia.

By J. G. O. Tepper, F.L.S.

[Read February 7, 1893.]

The species of plants of which the following list is an enumeration were collected by my son (J. W. O. Tepper) during the exceptionally dry years 1889 to the close of 1891. They were submitted to Baron Sir Ferd. von Mueller, F.R.S., &c., for identification; many of them were kindly determined by him; of the rest the genera only were indicated. In the latter case I have endeavoured by careful comparison with the descriptions to fix the species. Where there is any doubt remaining on account of insufficiency of the material obtainable, a note of interrogation follows the name.

The collector, with many other duties to attend to, and rarely leisure for extended excursions, procured most of the plants within the immediate neighbourhood of Roebuck Bay; the others were obtained at a visit to Hancock's Cattle Station, about 25 miles inland, an excursion to a part of the coast some seven to ten miles southward, and on a telegraph-line-repairing trip of about 30 miles towards Derby. Want of time prevented him also to attend to the matter systematically, and to supplement the specimens occurring at some considerable distance; hence the doubt attaching to some of the species. Incomplete as the list is, yet it affords a good illustration of what constitutes the flora there in very dry seasons. At the end of 1891 my son wrote that not only did the majority of shrubs or plants fail to put forth flowers or fruit, but remained or became nearly leafless! There existed then neither flowing nor stagnant water (fresh or brackish) at the localities examined, excepting the sea; and grasses or grass-like plants were rare or wholly absent. The locality must, therefore, be considered as belonging to the great Central Australian Desert, and its flora becomes very interesting as representing the extreme north-western extension of that region.

Roebuck Bay, or Port Broome, as it has been named recently, is situated on the north-west coast of Australia, in longitude 122° 12′ 36″ E., and latitude 10° 0′ 15″ S. It was sighted by the earliest Dutch navigators, and visited by Dampier about 1688, who named it after his vessel. The bay is formed by the mainland on the south, and by a narrow peninsula (five miles long by

two miles wide) on the north, the latter extending in a southerly direction, and separating Roebuck from Gantheaume Bay. The coastline exhibits low, steep cliffs of red sandstone at the base, 12 to 20 feet high, and overlain by sand or arenaceous clays, from 40 to 80 feet in thickness. The former, however, retreat sometimes for miles inland. The sea margin at the head of the bay is covered by mangrove (*Avicennia officinalis*, L.), succeeded by open grassy flats several miles wide, gradually passing into gentle rises and undulating hills (covered more or less thickly with scrubby vegetation) and more elevated grass lands. Roebuck Bay is, and has been for many years, one of the chief harbours of the pearling fleets, and has become the starting place of the West Australian submarine cable, as well as one of the ports of approach to the Kimberley gold-diggings, hence a small township has sprung up since 1890. The climate is extremely hot and dry, the maximum temperature being above 100° F. in the shade for many months in succession, and sinks rarely as low as 60° F. During the three years 1889-91 the rainfall was extremely scanty and insufficient, and appears to be uncertain, intermittent, and of short duration usually, though sometimes is heavy and accompanied by violent thunderstorms.

As informed by Sir Ferdinand v. Mueller, the locality had remained botanically almost unknown, notwithstanding its early discovery. Messrs. King and Gregory collected some plants there, but the former only near the coast, while most of the specimens of the latter proved unsatisfactory. Thus it is almost the first time that the locality has been extensively examined in regard of its botany, and my best thanks are due to my son for spending much of his scanty leisure in the collection and preparing of the specimens which form the subject of this paper, notwithstanding his other arduous duties and the unfavorable nature of the climate. There are enumerated 143 species (besides one wholly undetermined) comprised in 100 genera and 44 orders.

SYSTEMATIC LIST OF ROEBUCK BAY PLANTS.

[The months are those attached by the collector, and denote the flowering season, unless stated otherwise.]

Capparideae.

Cleome tetrandra, *Banks.* January, 1890.
——— viscosa, *L.* July, 1889.
Capparis lasiantha, *R. Br.* August, 1890.
——— spinosa, *L.* July, 1889.

Violaceae.

Hybanthus suffruticosus, *F. v. M.* December, 1889.

Droseraceae.

Drosera petiolaris, *R. Br.* February, 1891.
Byblis linifolia, *Salisbury.* February, 1890.

Polygaleae.

Polygala Tepperi, *F. v. M.* January, 1890.

Zygophylleae.

Tribulus hystrix, *R. Br.* September, 1889 (badly affected by a black, aphis-like insect).

Malvaceae.

Sida virgata, *Hooker.* February, 1890.
—— subspicata ?, *F. v. M.* July, 1889; February, 1890.
Abutilon graveolens ?, *W.* and *A.* July, 1889.
———— Cunninghami ?, *Bentham.* December, 1889.
Hibiscus microlaenus, *F. v. M.* January, 1890.
———— leptocladus, *Bentham.* January, 1890; December, 1889.
———— panduriformis, *Burmann.* March, 1890.
Gossypium australe, *F. v. M.* September, 1889.

Sterculiaceae.

Brachychiton diversifolius, *R. Br.* May, 1890.
Melhania incana, *Heyne.* August, 1889.
Commerçonia loxophylla ?, *F. v. M.* December. 1889.
Seringea corollata, *Steetz.* August, 1889.

Tiliaceae.

Grewia breviflora, *Bentham.* October, 1889.
Corchorus fascicularis, *Lamarck.* February, 1890.
———— sidoides, *F. v. M.* July, 1889.

Euphorbiaceae.

Euphorbia Mitchelliana ?, *Boiss.* July, 1889; September.
Phyllanthus ramosissimus ?, *F. v. M.* November 1889 ("Without fruit; perhaps new," F. v. M., in *litt*).
Securinega obovata, *F. v. M.* February, 1890.
Adriana tomentosa, *Gaudichaud.* April, 1890.
Mallotus aff. nesophilus, *F. v. M.* July, 1890.

Sapindaceae.

Atalaya hemiglauca, *F. v. M.* September, 1889.
——— variifolia, *F. v. M.* September, 1889.
Distichostemon phyllopterus, *F. v. M.* October, 1889.

Stackhousiae.

Stackhousia muricata, *De C.* March, 1890.
———— viminea, *Smith.* February, 1891.

Portulaceae.

Portulaca bicolor, *F. v. M.* February, 1891.
———— sp. January, 1890. "Different from all known forms."—*F. v. M.*

A low spreading herb, probably annual, 3 to 4 inches, branches numerous, opposite or alternate, basal leaves soon lost, stipular hairs numerous, very short, more persistent than the leaves; leaves opposite or alternate, narrow oval, oblong or almost obovate, $\frac{1}{4}$ to $\frac{3}{4}$ inch, in the specimens nearly all crowded at and near the apex of the branchlets. Flowers terminal, solitary, sessile between four or more floral leaves. Sepal broadly ovate, about $\frac{1}{4}$ inch. Petals pink (?), $\frac{1}{2}$ inch or more, broad, fugaceous. Capsule and seed not seen. The provisional name, *P. dubia*, is suggested.

Claytonia (Calandrinia) polypetala, *F. v. M.* January, 1890.

Caryophylleae.

Polycarpaea corymbosa, *Lamarck.* July, 1889.

Amarantaceae.

Gomphrena canescens, *R. Br.* August, 1889.
Ptilotus alopecuroides, *F. v. M.* September, 1889.
———— exaltatus, *Nees.* March, 1890.
———— Schwartzii ?, *F. v. M.* August, 1889.
———— Cunninghami, *Bentham.* September, 1889, in fruit; March, 1890, in flower.
Amarantus pallidiflorus, *F. v. M.* January, 1890.
"Used like cabbage by the natives as a vegetable."—*J. W. O. T.*

Salsolaceae.

Salsola Kali, *L.* November, 1889.

Ficoideae.

Trianthema pilosa, *F. v. M.* January, 1890, in flower; August, 1889, in fruit.

Phytolacceae.

Gyrostemon cyclotheca, *Bentham.* September, 1889, male flowers; February, 1890, female, in fruit.

Nyctagineae.

Boerhaavia diffusa, *L.* September, 1889; January, 1890.
———— repanda, *Willd.* July, 1889.

Leguminosae.

Isotropis atropurpurea, *F. v. M.* July, 1889.
Crotolaria crispata, *F. v. M.* April, 1890.
———— linifolia, *Linné fils.* April, 1891.

Crotalaria Cunninghamii, *R. Br.* September, 1889.
——— medicaginea, *Lamarck.* Small variety July, 1889; large variety March, 1890.
Psoralea Archeri, *F. v. M.* September, 1889.
Indigofera linifolia, *Retzius.* March, 1890.
——— viscosa, *Lamarck.* January, 1890, in flower; fruit in April, 1890.
——— hirsuta, *Linné.* February, 1890.
——— enneaphylla, *Linné.* February, 1891.
Tephrosia filipes. *Bentham.* January, 1890.
——— remotiflora, *F. v. M.* February. 1890.
——— purpurea, *Persoon.* September, 1889; flowers and fruit.
Zornia diphylla, *Persoon.* February, 1890; September, 1889, in fruit.
Uraria cylindracea, *Bentham.* February, 1891.
Alysicarpus longifolius, *Wight* and *Arnott.* 2-3 ft. high. November 19, 1890.
Galactia tenuiflora, *Wight* and *Arnott.* February, 1891.
Canavalia obtusifolia, *De C.* May, 1890. Flowers and fruit.
Abrus precatorius, *Linné.* February, 1890.
Caesalpina (Guilandina) Bonduc, *Linné.* December, 1889. Flowers and fruit.
Cassia notabilis, *F. v. M.* July, 1890. Flowers and young fruit.
——— pruinosa, *F. v. M.* End of December, 1889. Flowers and fruit.
——— oligoclada, *F. v. M.* January, 1890.
——— concinna, *Bentham.* March, 1890. Flowers and fruit.
Bauhinia Leichhardtii, *F. v. M.* August, 1889, in flower; September, 1889, in fruit.
Acacia lycopodifolia, *Cunn.* July, 1889.
——— holosericea, *Cunn.* Shrub 4 to 6 ft.; September, 1890.
——— tumida?, *F. v. M.* August, 1889.
——— acuminata?, *Bentham.* August, 1889.
——— bivenosa, *De C.* Four to five feet. October, 1891. Flowers and fruit.
——— signata?, *F. v. M.* August, 1890.
——— impressa?, *F. v. M.* May, 1890.

Combretaceae.

Terminalia petiolaris, *A. Cunn.* Flowers, December, 1889; fruit, January, 1890.
——— latifolia, *F. v. M.* January, 1890.
Native name, "Yamanarrie," fruit edible and slightly acid.—*J. W. O. T.*

Gyrocarpus Americanus, *Jacquin.* December, 1889,
"Tree 30 to 40 ft. high; leaves, though bright green when alive, always drying black."

Myrtaceae.

Calycothrix microphylla, *Cunn.* September, 1889.
Melaleuca leucodendron, *Linné* March, 1890.
Eucalyptus clavigera, *Cunn.* December, 1889.
———— terminalis, *F. v. M.* December, 1891.

Rhamnaceae.

Ventilago viminalis, *Hooker.* July, 1890.

Santalaceae.

Santalum lanceolatum, *R. Br.* Middle of November, 1889; fruit.
Exocarpus latifolius, *R. Br.* Tree, 10 to 15 feet; November, 1890.

Loranthaceae.

Loranthus amplexifolius, *F. v. M.* September, 1889.
———— bifurcatus, *Bentham.* July, 1890.

Proteaceae.

Persoonia falcata, *R. Br.* October, 1891.
Grevillea refracta, *R. Br.* February, 1890.
———— mimosoides, *R. Br.* July, 1889.
Hakea macrocarpa, *A. Cunn.* July, 1889.
———— arborescens, *R. Br.* December, 1889; February, 1890.

Rubiaceae.

Oldenlandia trachymenoides, *F. v. M.* February, 1890.
Gardenia Pantoni, *F. v. M.* October, 1889.
Ixora tomentosa, *Roxburgh.* November, 1889.
Canthium oleifolium, *Hooker.* Flowers, end of December, 1889 fruit, December, 1890. A tree 15 to 20 feet high.
Spermacoce pogostoma, *Bentham.* Flowers, July; fruit, November, 1889.

Compositae.

Vernonia cinerea, *Lessing.* End of December, 1889; flowers and fruit.
Pluchea tetranthera, *F. v. M.* April, 1891; flowers and fruit.
Pterigeron macrocephalus, *Bentham.* September, 1889; flowers and fruit.
Pterocaulon sphacelatus, *Bentham.* September, 1889; flowers and fruit.

Goodeniaceae.

Calogyne Berardiana, *F. v. M.* January, 1890; seeds orbicular.

Velleya panduriformis, *Cunn.* End of November, 1889; June, 1890.

Leschenaultia sp. May, 1890.

Intricately and dischotomously branched under-shrub. Leaves minute, sessile, acute. Flowers not seen. Fruits obovate, gradually narrowed to the base; apex rounded or subtruncate, one-third to one-half inch long, about one-eighth inch thick; peduncle very short, apex thickened. Branches and branchlets very slender, nodes distant.

Loganiaceae.

Mitrasacme lutea, *F. v. M.* February, 1891.

——— n. sp.? November, 1889.

Small herb. Leaves radical linear, narrowed at the base into a very short pedical, apex truncate or obtuse. Peduncle slender, erect or ascending, about two inches, with one or two short branches above the middle. Flowers rather large terminal. Sepals broadly ovate, acute, about one line. Petals pale pink or white, about one-third of an inch. Fruit not seen. There is a minute, scale-like bract below the branches, and another near the middle of the latter, but none on the main peduncle beyond the bifurcation. The bracts terminate in a short recurved bristle.

Jasmineae.

Jasminum aff. didymum, *G. Foster.* November, 1889.

"The leaves are much narrower than of any other form of *J. didymum.* The fruit may be different, and if so, the species would be new for Australia."—*F. v. M., in litteris.*

Apocyneae.

Carissa Brownii, *F. v. M.*, var. angustifolia. November, 1889.

Wrightia saligna, *F. v. M.* December, 1889.

Asclepiadeae.

Gymnema stenophyllum, *A. Gray.* December, 1889.

Marsdenia aff. velutina, *R. Br.* February, 1891. Flowers and fruit.

Convolvulaceae.

Convolvulus parviflorus, *Vahl.* March, 1890.

Ipomaea diversifolia, *R. Br.* April, 1891.

——— heterophylla, *R. Br.* April, 1891.

——— aff. eriocarpa, *R. Br.* February, 1890.

Polymeria angusta, *F. v. M.* February, 1890.

Evolvulus linifolius, *Linné.* September, 1889; December, 1889

Solanaceae.

Solanum diversifolium ?, *F. v. M.* December, 1891.
"Growing near water, 40 miles south of Roebuck Bay."—*J. W. O. T.*
——— quadriloculare, *F. v. M.* December, 1889.
——— esuriale, *Lindley.* September, 1889.

Scrophularinae.

Buechnera gracilis, *R. Br.* April, 1890.

Bignoniacae.

Dolichandrone heterophylla, *F. v. M.* April, 1890.

Acanthaceae.

Hypoëstes floribunda, *R. Br.* September 24, 1889.

Asperifoliae.

Ehretia saligna, *R. Br.* November, 1889.
Heliotropium paniculatum, *R. Br.* October, 1889.
———— Cunninghamii ?, *Bentham.* September 24, 1890.
Polichia Zeylanica, *F. v. M.* August, 1889.

Verbenaceae.

Premna integrifolia, *Linn.* January, 1890.
Clerodendron floribundum, *R. Br.* Flowers, November, 1889; fruit, April, 1890.
———-——— tomentosum, *R. Br.*, var. September, 1889; March, 1890.
Avicennia officinalis, *Linné.* End of December, 1889. In fruit only.

Myoporineae.

Myoporum Dampieri, *Cunn.* July 6, 1889.

Orchideae.

Cymbidium canaliculatum, *R. Br.* November, 1891.
"Rare. Only found growing on large galls or swellings affecting *Eucalyptus clavigera.*"—*J. W. O. T., in litt.*

Commelineae.

Aneilema gramineum, *R. Br.* January, 1890; February, 1891

Cyperaceae.

Cyperus eragrostis ?, *Vahl.* December, 1889.
———— (Mariscus) conicus, *Boeckel.* End of December, 1889.

Gramineae.

Spinifex longifolius, *R. Br.* November, 1889.
Eragrostis eriopoda, *Bentham.* April. 1890.

The "Mirrn-yong" Heaps at the North-West Bend of the River Murray.

By R. Etheridge, jun., Palæontologist to the Australian Museum, and Geological Survey of New South Wales.

[Read March 7, 1893.]

Sir T. L. Mitchell, Surveyor-General of New South Wales in the early days, described* the aboriginal method of cooking food in general "by digging a hole in the ground, making a fire in it, and heating stones about." This may be accepted as a perfectly accurate statement couched in very general terms, and is more or less applicable to almost every part of the Continent, for whatever modification may locally exist, stones, in one way or the other, enter into the operation.

For the purpose of more precise description, the cooking or feasting-places of the aborigines may be arranged under four sections :—

1. Kitchen-middens, or shell-mounds of the coast line.
2. *Mirrn-yong* heaps.
3. Native, or Blackfellows' Ovens.
4. Cave-shelter, or *Gibber-gunyah* hearths.

This classification, like so many others in different branches of Natural Science, is but artificial and provisionary, for it is possible without much difficulty to select a case in which the conditions partake of those of more than one of the above sections.

The *Mirrn-yong* heaps of the Murray, of which it is intended to give a short description in the present communication, are a case in point. They are not strictly identical with similar heaps to be met with in many parts of Victoria, or with the Blackfellows' Ovens of the same colony, but in a greater or less degree combine the characters of both.

It is hardly necessary to refer to the other section just now, but perhaps it may be as well to explain the limit attached to the use of the terms. The term Kitchen-midden is restricted to the large shell-heaps occurring at intervals around the coast-line, exhibiting a rough stratification, and composed of whatever species of shells the natives of any particular neighbourhood may have been in the habit of existing on. Native, or Blackfellows' Ovens appear usually as stony irregularities of the surface, more or less circular, often of large size, and grassed with great luxuri-

* Three Expeditions Int. E. Australia, II., p. 343.

ance and wealth of colour. Each mound consists of a collection of wood-ashes, charcoal, and stones, and is of a depressed conical shape. The diameter varies from a foot or two up to eighty, and two feet high in the centre. The distribution of these ovens is limited, being recorded only from Central and Western Victoria, and across the Murray into New South Wales as far as the Lachlan.

Cave-shelter, or *Gibber-gunyah* hearths are deposits, of tenin the form of a talus, at the mouths and entrances of the semi-caverns formed by overhanging ledges of rock, and are particularly common throughout the Hawkesbury Country of New South Wales, when contiguous to saltwater creeks or arms of the sea. These shelters appear to have been continuously inhabited for long series of years. The tali consist of stratified ashes, burnt and unburnt shells, charcoal, and other *débris*, with here and there a few stones.

Lastly *Mirrn-yong* heaps are usually found contiguous to rivers, lakes, or marshes, and in a sheltered situation. They consist of oval, or at any rate, longer than broad depressed mounds, often of considerable extent, as much as one hundred feet long, made up of soil, burnt clay, wood-ashes, charcoal, burnt fresh-water shells, burnt and unburnt bones, tomahawks (whole or fragmentary), chips of other rocks, and works of industry, such as bone awls, bone nose-ornaments, and the less perishable articles of aboriginal everyday use. Within these heaps the scattered cooking places, composed of stone, occur, each site having been used by generation after generation of blacks, and the entire mass slowly heaped together, thus representing the work of a long period of years.

It is to this section that I believe the refuse heaps at the North-West Bend are referable.

Under the excellent guidance of Prof. R. Tate, and with Mr. H. Y. L. Brown, I was able to visit what remains of a large series of cooking places near Morgan, on the north bank of the Murray, about two miles east of the town. From the long continuation of broken shelly matter, ashes, and rubbish around these "ovens," the whole must have formed a midden of no mean dimensions previous to its disintegration by the depasturing of sheep, and other causes of a like nature. The escarpment of the river here forms perpendicular cliffs, from sixty to eighty feet high, with here and there a short, broken, and more or less precipitous gully leading down to the water's edge. On the sides of such a gully, and along the cliff top, at about the point mentioned, the surface consists of a large quantity of broken and even comminuted shell-fragments, mixed with dark carbonaceous matter and soil. The deposit occupies a depression on the cliff top, the rising

of the ground beyond tending to form a small and shallow amphitheatre, in which it occurs, perhaps about one to one and a half acres in extent, and ranging at least for 150 yards along the cliff. The shelly *débris* is composed of *Vivipara Hanleyi*, and valves, whole or fragmentary, and at times highly comminuted, of the river *Unio*. The fragments and minute particles into which the shells have been broken, from their nacreous lustre, particularly those of the *Unio*, readily assist in defining the extent of the deposit. Quartz chips may also be picked up in abundance here and there, and have evidently been used. Professor Tate says that no deposit of quartz is known for many miles round. Scattered irregularly over this area, frequently in close proximity to one another, are a number of small, circular ovens, usually about three feet in diameter, seldom more. The stones, about the size of the clenched fist, or rather larger, are firmly bedded in the made soil, but all show, more or less, the traces of fire, possessing a blackened, and in some places a greasy look, whilst in others a semi-fused appearance seems to indicate that they had been subjected to a considerable amount of calorific influence. Black nuclei to the concretionary travertine not unfrequently found on the Murray Cliffs, and about the shores of St. Vincent's Gulf, are ascribed* by Professor Tate to the carbonisation of the fatty matter of animals, which has penetrated into the stone in the process of cooking *à l'aborigine*. Some such process has, no doubt, taken place in the present instance.

The former greater area of this midden is proved by the fact that the cliff edge now cuts across some of the ovens, the action of the river at this particular spot undermining the cliffs, and bring down large masses. No doubt many similar middens might be found on other parts of the river, for on the opposite, or south side, about half-way between Morgan and Fossil Cliff, where the bank is gently inclined, is a deposit of black carbonaceous soil and comminuted shell fragments, extending up from the water's edge, which, although no stones were observed in heaps, represents, I have no doubt, another large midden. How like is the material composing these heaps to the soil of the middens seen on so many of the small promontories jutting out in Middle Harbour, Port Jackson ; the Hawkesbury and its branches ; and other inlets on the east coast. Hardly a point along these waters but has its heap, consisting of carbonaceous matter, charcoal, soil and humus, intermingled in various states of disintegration with cockle, mussel, limpet, and other common shells of the coast, and here and there oysters. Many of these must be very ancient, and have taken years to accumulate. The soil observed on the

---

* Trans. Phil. Soc. Adelaide for 1878-79 [1879], p. 115.

Murray is very similar in all but its accompanying species of Mollusca. In these Murray middens it seems to me we have a combination of Sections 2 and 3, *Mirrn-yong* heaps and native ovens previously described. There is the fine carbonaceous soil and comminuted shelly matter of the former, and interspersed in it the small circular cooking places answering to the more isolated native ovens of Central and Western Victoria, and the Murray country, extending some little distance into New South Wales along the course of that river.

The shells found throughout the deposit were clearly used as food, and as regards the Unios this is interesting, for Grey says† that in South-western Australia the natives would "not touch fresh-water mussels," very abundant in the rivers there ; but that in the north-western part of the continent "they form a staple article of food."

---

* North-west and West Australia, 1841, II., p. 280.

The Blattariæ of Australia and Polynesia.

By J. G. O. Tepper, F.L.S., &c.

[Read March 7, 1893.]

Introduction.

The Blattariæ form a section of the heterogeneous order of the Orthoptera, and are now usually placed as the second in the series, the Forficulariæ or Earwigs preceding them. They have been so designated by Latreille, Serville, and Fisher, while Burmeister calls them Blattina, Stephen terms them Blattidæ, and Brunner van Wattenwyl in his "Prodromus of European Orthoptera" modifies the term to Blattodea. Popularly they are called *Cockroaches* or *Black Beetles* by the English; *Schaben* by the Germans, and *Kakerlaks* by the French. Palæontologically the cockroaches appertain to the most ancient insects known, impressions of wings, &c., having been found in the Carboniferous (*i.e.*, true coal-bearing) strata of Europe and America. At the present time they are distributed over the whole earth, except the polar and alpine regions, and embrace numerous species arranged by Brunner into eleven families, to which I have added another.

The affinities and differences of the suborders of Orthoptera, as summarised by modern authors, are best indicated by the following synopsis :—

1. Organs of flight in normal position during the larval stage. Legs, inclusive of posterior femora, fitted for running, rarely for burrowing). Ovipositor concealed by a subgenital lamina. All voiceless.
   2. Wings, when present, folded tranversely in the middle of the anterior margin. Tarsi with three joints, arolia none. Cerci corneous, resembling and acting as forceps. *Forficulariæ.*
   2.2. Wings, when present, folded longitudinally from the base. Tarsi five-jointed, with arolia. Cerci soft, more or less distinctly jointed.
      3. Body depressed. Head retracted. Pronotum shield-like; transverse. Legs compressed. Cerci articulate. Insects fitted for swift-running, rarely for burrowing. *Blattariæ.*

3.3. Body elongated. Head free. Pronotum elongate. Legs slender, terete. Cerci articulate or the joints scarcely distinct. Insect fitted for walking.

4. Forelegs raptorial. Cerci distinctly articulate. *Mantodea.*

4.4. Forelegs not raptorial, simple, mostly very much elongated. *Phasmodea.*

1.1. Organs of flight inverted during the larval state. Hind-femora fitted for leaping. Ovipositor free, corneous. Organs of voice and sound-production present. *Acridiodea, Locustodea, Gryllodea.*

General Characteristics.

Form, Size, Colour, &c.—The outline of the body throughout the whole section of the Blattariæ is very uniform, varying only from subhemispherical in *Cassidodes* to compressed elongate-oval, the intermediate grades being the most common. In size the adults vary from less than a quarter of an inch to about three inches in length ; but the extreme sizes are comparatively rare. The colours are usually sombre, mostly some shade of brown, reddish, or yellowish, beside black ; bluish, greenish, and metallic tints, however, occur in the genus *Polyzosteria.* The markings, when defined, are fairly constant as well as the general ground-colour ; the eyes of the living insects are perhaps invariably black, and the variations recorded by Walker are in the case of Australian species scarcely anything else than the discolouration produced by drying, putrescence, &c., or the effects of alcohol and other chemicals. In the larval state the general colour is often much paler and the markings much more definite and decided than with the adults, although exhibiting the same general type.

Habits, Food, &c.—The habits of most species are nocturnal or crepuscular, the remainder—sometimes all the species of large genera—are entirely diurnal, notably of *Apolyta* and *Polyzosteria* as limited by me. The majority appears to be wholly carnivorous, their food consisting of other insects, eggs, larvæ, &c., or their dead bodies, even of their own kind ; the comparative immunity of our native shrubs, &c., from attack of injurious insects is probably owing to a considerable extent to the silent hunting of the formerly very numerous cockroaches, which, like the ants, are not preyed upon by birds, on account of their disagreeable scent. A smaller part, however, are decidedly less particular in their diet, almost omnivorous, such as *Periplaneta orientalis* and *P. americana.* It is this minority which has brought discredit upon the group, by making human habitations their almost ex-

clusive residence, and attacking man's stores. But even these limit themselves in vegetable diet to ripe or prepared fruits, or other vegetable food substances suitably altered by cooking or decay, and I have not met with a single case of living plants having been attacked by them. The greater proportion of species is therefore beneficial to man and Nature generally, notwithstanding their repulsive exterior.

As far as known hitherto the Blattariæ choose as hiding-places during periods of inactivity any dark, secluded spaces, under logs of wood, stones, bark, vegetable debris, or anything offering shelter and protection, and without constructing themselves any burrows or individual homes. The individuals of the genera *Epilampra* and *Oniscosoma*, especially the females, however, are known to bury themselves in loose soil or dust, and their fore tibiæ accordingly exhibit a somewhat modified structure, enabling them to displace the loose particles, being incrassated, and the spines long and stout, though still unmistakably on the normal type. None appear to have been known of truly burrowing habits, like the crickets, until the discovery of a large wingless species near Broken Hill, and subsequently at Renmark, the fore tibiæ of which are sufficiently modified to enable it to burrow in ordinary soil, *e.g.*, red clay. Differing in this direction so much, and correspondingly in other details, I have formed a new family—Geoscapheusidæ—for this singular species.

Owing to their voracity and cannibalistic tendencies, the carnivorous species lead more or less solitary lives, and one meets rarely several together in close proximity; they are not at any time very numerous, on account of the stronger devouring the weaker in lack of other prey, and thus their number is strictly limited by the food supply. It is only such that have developed tastes for amylaceous fare in preference to animal diet which trouble man by invading his habitations in large numbers, and living gregariously and peacefully together, as long as absolute want of food does not force them to extremes, when they do not hesitate to eat each other, nor will they leave the body of a dead comrade undevoured if discovered before quite dry. On the whole cockroaches belong to Nature's best scavengers in wood, field, and garden.

Distribution.—Some of the omnivorous kinds are almost cosmopolitan, being only restricted by the extreme limits of temperature bearable for them. Many species are, however, limited to more or less restricted areas, and disappear with the flora of the regions they inhabit, notably those that are destitute of the power of flight in one or both sexes. Being very shy, swift of motion, and usually endowed with repulsive smell, their habits are difficult to study, and therefore little is known of the vast

majority. It is to be hoped that the present attempt to define and describe our known species may induce others to take up this promising subject.

In the present state of our knowledge, it is impossible to state even an approximate number in respect of defined species. One of the causes is that several authors have been simultaneously and independently at work, with the result that the same species has received different names, which can only be rectified by a thorough revision in Europe by some one with means and leisure to compare the types.

Brunner van Wattenwyl (Nouveau Systeme des Blattaires, 1865), the highest authority on the suborder, describes 378 species in 56 genera, distributed all over the world, many of which occur in two or more continents, but only two species are wholly cosmopolitan, viz., *Periplaneta orientalis* and *P. americana*. The following table will give a general idea of their distribution as known at the date of Brunner's work :—

	Total of Species.	Endemic Species.	Species common to two or more regions.
Europe	18	14	4
Asia and Malay Archipelago	89	62	17
Africa, Madagascar, &c. ...	72	59	13
North America, Mexico, W. India	52	41	11
South and Central America	141	129	12
Australia, New Zealand, and Polynesia	48	38	10
Habitat unknown	7	—	—

The number of endemic species is 343, and 35 are of wide distribution out of the total of 378.

In Walker's British Museum Catalogue (1868) and the Supplement (1869) a much larger number is recorded, but owing to duplication of names, and absence of appreciation of some of the most essential characters, great confusion has resulted, and many of his species are quite uncertain. Since his time some additions have been made by Saussure, Stăl, and Bormans, comprising a moderate number of Australian forms (chiefly from the eastern colonies and islands). Of the later publications of Saussure, recorded by Walker, or of those of the two other writers I have not been able to obtain sight, but expect to get copies in the course of the year, when possible corrections will be duly noted.

In the present paper 193 species are recorded, being comprised in 33 genera and 10 families, of which 1 family, 9 genera, and 55 species are new. The Periplanetidæ are the most numerous with

94 species (or nearly one-half) in 8 genera. The total number of species referred to, unaccompanied by descriptions, is 33, three of which belong to monotypic genera. As only two or three of this species inhabit parts of Australia from which species are described as new by me, scarcely any clashing of my work with that of the older authors is anticipated.

The Characteristic Organs.—The various external organs of the Blattariæ are constructed on so uniform a plan that it appears almost impossible to mistake a cockroach for any other kind of insect, even upon a most cursory inspection ; the systematist has therefore to resort frequently to minute variations in order to insure ready recognition of his species. Fortunately these small differences appear to be remarkably constant, and are therefore the more valuable.

The Head is always more or less retracted, the face flat, the vertex prominent, and the mouth directed rearward, the whole being either entirely concealed under the forepart of the thorax, or only a small portion exposed. The eyes are large, oval or kidney-shaped, and placed more or less obliquely ; during life they appear to be always black. The *ocelli* are mostly only indicated by two pale coloured spots in front, are sometimes wholly absent, and in the *Heterogamidæ* alone are they developed to any extent. Their form, colour, &c., afford sometimes good subsidiary, specific, or varietal distinctions. Such are likewise offered by the face *(frons)*, labrum, clypeus and palpi, occasionally notable in their colour markings, although their structure varies little or irregularly. The *antennæ* are always slender, and mostly filiform or setaceous (sometimes sub-moniliform or ciliate), varying in length from less than half that of the body to more than doubly exceeding it. As in other Orthoptera, the mouth parts are not employable for general classification on account of their great uniformity of structure, and are only occasionally made use of.

The Organs of Flight consist of an anterior pair of more or less leathery or horny elytra, and a posterior pair of much more delicate membraneous wings. One or both pairs may be rudimentary, lobiform or entirely absent, and either perfect in both sexes, or only in the male. The absence or more or less rudimentary state of them are especially prominent in the Australian insects, and favours the localisation and multiplicity of species. They supply most important distinctions.

The Elytra, when present, exhibit a system of veins analogous to that of the other genuine Orthoptera. The *costal* or *mediastinal* vein is very short, usually terminating within the basal-third of length of the fore margin (costa), and is always branchless ; in some genera it shows a more or less tumid keel beneath. The *radial* or *scapulary* vein is free from the base, and emits

branches only towards the costa, except in *Ectobia*, where such are also emitted on the opposite side. The *inframedial* or *ulnary* vein is only separated by a very narrow space at the base from the preceding, which gradually widens during its subsequent course; it mostly separates into an anterior and posterior branch from the start, both branching out towards the border, the inter space being more or less crossed by transverse veinlets. The *dividing* or *anal* vein is the last ; it proceeds in a more or less pronounced, generically distinct, curve (often very short), and is unbranched. By it the anal area is bounded, which contains a varying number of straight or reticulating veinlets. The left elytron usually covers the right one, but in rare cases have I observed the reverse. These organs afford most important distinctive characters by the arrangement, curvature, &c., of the veins for the separation of families and genera, and it is the neglect of these which renders the descriptions by Walker and some others so unsatisfactory.

The Wings present homonymous veins, but present a different arrangement in respect of the areas bounded by them, the *anal* vein being straight, dividing the wing nearly in equal halves, and terminating in an angular emargination of the exterior margin, or in some genera cut off by a *triangular area*, which folds fan-like, and in some cases is more or less largely produced beyond the ordinary outline of the border. The *costal* vein turns usually midway towards the fore margin, emitting some straight branches into the same. The *scapulary* vein emits oblique branchlets into the apical half of the costa, and a stouter branch from about the middle towards the apex. In some genera, as *Ectobia* and *Phyllodromia*, it is also connected by short transverse vein with a spurious one proceeding from the border towards the middle without a terminal connection. The *ulnary (inframedial)* vein is mostly separated by a narrow hyaline space from the foregoing, and usually emits more or less numerous branchlets rearward, but in some cases, as in *Ectobia* and *Phyllodromia*, remains simple. The *anal* area contains a number of nearly straight radiating veinlets, more or less connected by transverse reticulations. Important distinctions are often supplied by the wings.

The venation of rudimentary or abbreviated organs of flight is mostly quite distinct in both pairs, and the border is either entire *(Periplaneta)* or jagged *(Panesthia australis)*. When lobiform, the bases only of the principal veins are more or less discernible. The presence of either of these forms, when free, denotes adults; while in the advanced larval stage, and preceding the final moult, both pairs (or one) are made manifest by elongation of the hind-angles of the meso- and meta-notum, and their being more or less plainly discernible, although covered over completely by a thin

contiguous membrane. Adults, when quite wingless, are recognised by the complete development of the genital appendages and the much greater rigidity of their integument.

The *sternal segments* of the thorax are almost concealed by the broad, flat *coxæ*, which are either concolorous, striped darker and paler, or bordered by pale exterior margins.

The Legs are strong, and all fitted for swift running, except in the family *Geoscapheusidæ*, in which the anterior pair is conspicuously modified for burrowing. The *trochanters* are usually large, and the apex, in some cases, produced as a short spine. The *femora* are much compressed, and either all simple or hairy, or provided with two rows of longer or shorter spines on the inner side, or, in a few instances (*Ataxigamia*, *Gynopeltis*), the fore femora alone are spined. The character of being thus armed or not is used to divide the Blattariæ into two main divisions. The *tibiæ* are either slender, incrassated, or, in *Geoscapheus*, dilated and flattened anteriorly, and are all armed with four rows of spines, which are more or less developed, but afford no reliable distinctions. The *tarsi* consist of five joints (one sometimes obsolete), are slender and compressed ; each joint has usually a pulvillus or pad beneath, while in some cases an arolium between the two claws is present. The first joint is always the longest, sometimes very long, and its comparative length distinguishes some families or genera.

The Abdomen consists of nine segments and the anal appendages. The first segment is more or less obliterated and amalgamated with the metanotum, especially in the winged species, while in the wingless it appears dorsally as a very narrow extended arc of a circle, projecting from beneath the hindmargin of the metanotum, and does not attain the lateral margin. The following six segments are well developed, their texture, colouring, &c., and the form of their hind angles afford some useful specific distinctions. Tho eighth segment is usually entirely covered by the preceding one, and only denoted laterally by its produced posterior angles. The ninth is still more reduced, and bears the articulated *cerci* and the supra-anal lamina between them. The size, &c., of the former supplies important characters for the distinction of families, genera and species, while the latter is still more important in this respect. On the *ventral side* the males exhibit usually 7—8 zonal segments, the female six ; to the last are appended the subgenital lamina with the styles of the males, and the divided or united valvules of the females ; the genitalia proper of both sexes are quite concealed by these organs, which, in most instances, are very important for classification or identification.

The ova are not deposited singly, but collectively in an egg-

case, which remains attached to the female by a membrane connected with the subgenital valvules or plate until containing the normal number of ova fixed for each species. Although of similar type, specific or generic differences appear to be developed, but our knowledge in this direction is still very meagre. The cases are very elastic, and consist of a double row of cells, each with one egg ; they are marked laterally by slight furrows, and the keel above by notches, crenulations, or teeth ; the cells open valvularly to permit the escape of the young when hatched, but close again and appear intact.

SYNOPSIS OF FAMILIES.

1. Femora spined.

2. Abdomen of female with last segment large, flat ; subgenital lamina obsolete.

3. Supra-anal lamina of both sexes very narrow, transverse. Wings, when developed, with an apical triangular area.

I. Ectobidæ.

3.3. Supra anal lamina more or less produced, triangular, incised, or lobed. Wings without apical triangular area.

II. Phyllodromidæ.

4.4. Supra-anal lamina of male more or less quadrate, of female incised, lobes rotundate or broadly rounded and entire. Cerci scarcely as long as lamina, or very little exceeding the same.

5. Body flat, or moderately convex. Males winged, females wingless. Fore legs gressorial, fore tibiæ clavate, spines in double series. Supra-anal lamina of male more or less quadrate, of female incised, lobes rotundate, or rarely entire. Cerci long, articulate. III. Epilampridæ.

5.5. Body thick, broad. Both sexes wingless. Fore legs fossorial, fore tibiæ flat, spines palmate, in single series. Supra-anal lamina of both sexes broadly rotundate, entire. Cerci very short, joints indistinct. IV. Geoscapheusidæ, fam. nov.

2.2. Abdomen of female with free valvules, or these rarely united by a suture. V. Periplanetidæ.

a. Cerci as long as supra-anal lamina, or scarcely longer. Elytra none, or lobiform. Polyzosterinæ.

b. Cerci much longer than lamina. Elytra perfect or rudimentary, rarely lobiform or absent. Periplanetinæ.

1.1. Femora not spined, or rarely only the anterior ones.

2. Claws with arolia (excepting the females of Heterogamidæ).

3. Forepart of wings rounded, or with plicate apical triangular area. VI. Chorisoneuridæ.

3.3. Forepart of wings rounded, without triangular apical area.

4. Wings with anal area flabellate. Pronotum glabrous (except in some species of *Derocalymma* and *Perisphaeria*.)

5. Abdomen of female with supra-anal lamina quadrate, incised, or entire; hind angles of abdominal segments produced.
VII. PANCHLORIDÆ.

5.5. Abdomen of female with supra-anal lamina rotundate, dorsal segments truncate, hind angles not produced.
VIII. PERISPHAERIDÆ.

4.4. Wings with anal area not plicate. Pronotum ciliate.

5. Supra-anal lamina of female rotundate. Extra Australian.
(CHORYDIDÆ).

5.5. Supra-anal lamina of female quadrate, incised.
IX. HETEROGAMIDÆ.

2.2. Claws without arolia (except the females of *Heterogamidæ*).

3. Supra-anal lamina of both sexes quadrate, incised. Elytra flat, much exceeding the abdomen (Extra Australian).
(BLABERIDÆ).

3.3. Supra-anal lamina of both sexes transverse, entire, rotundate. Elytral abbreviated or constricted in the middle, and exceeding the abdomen. X. PANESTHIDÆ.

SYSTEMATIC DESCRIPTIONS.

The following works were principally consulted and availed of to a considerable extent:—

C. Brunner van Wattenwyl, *Systeme des Blattaires*, 1865; Burmeister, *Handbuck der Entomology*, Vol. II., 1838; Walker, *British Museum Catalogue of Blattariæ*, 1868; and *Supplement*, 1869. Also the "Zoological Record," and several minor publications.

I. ECTOBIDÆ.

Body of male elongate, of female dilated. Penultimate joint of the palpi not exceeding the last by more than one half. Wings horny, or leathery, or lobelike, and leaving the scutellum uncovered. Radial vein united at the base with the ulnary, and either emitting branches to the sutural margin, or the veins divide, and if not themselves forked, emit forked branches towards the apex. Wings, when present, with the anal (dividing) vein dichotomous at the apex including a pellucid triangular membrane readily folded between the branches, radiating veins united by a single transverse veinlet. Legs slender, femora spined. Supra-anal lamina of male very narrow, transverse. Subgenital lamina of male oblong triangular, styles rarely provided. Last ventral segment of female ample, or produced, emarginate.

ECTOBIA, *Westwood.*

Phyllodromia, Serv.; *Phyllodromica*, Fieber; *Blatta*, &c. (*Br.*, Syst., pl., fig. 1).

Wings perfectly explicate, apical triangular area small. Femora moderately spinose. Supra-anal lamina of both sexes transverse, very narrow. Male without styles. Female with last ventral segments large.

The genus comprises only small-sized insects. The costal vein is short, straight, and cuts off a broad area ; the radial and ulnar veins are united (or rather the latter is obsolete), and emit branches on both sides, which is not the case in any other family. The anal vein curves convexly towards the hindmargin, and near it turns outward and meets the margin obliquely. The anal area is comparatively broad, and it and the radial area are provided with transverse veinlets.

ECTOBIA LIVIDA (*Fabr.*), *Brunner*, Syst., 59.

"Body pale. Head brown, vertex ferruginous. Pronotum large, margin of disk slightly reddish. Elytra flat, broad, as long as the abdomen or longer, with brownish dots along the radial vein, sometimes obsolete. Legs pale brownish. Abdomen black, margins and apex pale.

	Male.	Female.
Length of body	9·5 mm.	8 mm.
Length of elytra ...	10 "	6·5 "
Length of pronotum ...	2·5 "	2·8 "
Width of pronotum ...	3·5 "	3·8 "

Habitat.—Europe, Africa (*Brunner*), Australia (*Walker*)."

ECTOBIA MARCIDA (*Erichson*), *Br.*, Syst., 61.

"Body pale. Disk of pronotum clouded with testaceous. Elytra sparingly veined, interstices brownish. Abdomen piceous, margins pale. Neither measure nor sex recorded.

Habitat.—Tasmania."

ECTOBIA LUCIDA, *Brunner*, Syst., 62.

"Body chesnut-coloured, shining. Pronotum with lateral margins and median streak scarcely distinct. Elytra with costal area sometimes testaceous, acuminate ; radial and ulnar veins *separated at the base*, emitting parallel branches towards the apex, none to sutural margin.

	Male.
Length of body	7 mm.
Length of elytra	8 "
Length of pronotum	1·8 "
Width of pronotum	2·3 "

Habitat.—Australia."

Ectobia apicifera, *Walker* (Blatta), Br. Mus. Cat., 110.

Greyish-white and brown. Head very broad, vertex forming a transverse ridge. Face pale, except a brown semi-elliptical spot between the antennæ and eyes with white margins and median line. Antennæ as long as the body, hairy, pale-greyish. Pronotum wider than long, rounded laterally and in front, straight behind, anterior and lateral margin broadly whitish, former narrowly bordered with black above the eyes, disk brown, with a fine, pale median line and a deep triangular sinus on each side anteriorly. Elytra elongate oval, deep brown, costal and anal margins broadly pale, showing two broad, brown stripes when at rest. Wings pale. Abdomen pale yellowish above, segments bordered dark behind. Underneath pectus and legs pale, abdomen dark with pale margin, last segment and apex partly blackish.

	Male.
Length of body	8 mm.
Length of elytra	6·5 "
Length of pronotum	1·8 "
Width of pronotum	2·6 "

Habitat.—Mount Lofty Range, South Australia. S. A. Museum; one adult male.

An imperfect specimen, referred to this species, has the blackish stripes of the elytra continued over the pronotum, and the black spot of the face more indistinct, but was taken at another place and time. The species, although here recorded under Walker's name, is re-described from the specimens.

II. PHYLLODROMIDÆ.

Wings, when present, without apical triangular area. Elytra and wings perfect or rudimentary; radial vein without posterior branches or only a single branch emitted towards the apex; branches of ulnar vein oblique; anal vein similar to that of preceding family. Abdomen of female with last segment large, without subgenital lamina. Supra-anal lamina of both sexes more or less produced, triangular, incised or lobed. Cerci more than twice the length of the lamina.

Loboptera, *Brunner*, Syst. 79, fig. 5.

Body oblong ovate. Pronotum oblong, or transverse. Elytra abbreviated or lobiform, wings absent. Femora thickly spined, compressed, dilated, also the tibiæ. Abdomen flat in both sexes, sometimes wider in the female than the male. Supra-anal lamina triangularly produced, emarginate in the female. Subgenital lamina of male triangular, obtuse, without styles, or very minute and slender.

Loboptera trivittata (*Erichson*).

Brunner, Syst., 82; Arch. f. Nat. viii., 248.

"Yellow. Body with three black stripes, brownish posteriorly, the middle one obliterated anteriorly.

Length of body (sex ?) ... ... 9–12 mm.

Habitat.—Tasmania."

Loboptera halmaturina, *sp. nov.*

Pale yellowish. Male oblong, female dilated behind. Two broad piceous stripes from the eyes to the middle of the cerci or rather beyond. Face with a piceous stripe widest between the antennæ, and there nearly severed by a pale transverse line or triangular spot. Pronotum with the pale space in the middle much wider behind and marked by a black spot resembling the conventional "Broad Arrow," and repeated on the disk of the mesonotum, but extending quite across it. Metanotum with a median line much wider behind, sometimes reduced to a triangular dot on the hindmargin and two dots or short transverse bar, also a short, very fine line on either side. Abdomen with a more or less defined median line or stripe of variable form (almost obsolete in some female specimens). Underneath the pectus and coxæ are pale, the latter with two black dots; the legs pale, tibiæ with black dots along the exterior margin and black apices; abdomen piceous to black ventrally.

	Male.	Female.
Length of body	7·5 mm.	8 mm.
Length of pronotum ...	2·3 "	2·5 "
Width of pronotum ...	2·9 "	3·3 "

Habitat.—Near head of Western Cove, Kangaroo Island, captured by myself on *Callitris verrucosa* (Native Cypress-Pine). Six specimens (S.A. Museum).

Loboptera duodecimsignata, *sp. nov.*

Flat, fusiform. Brownish or reddish-yellow, dusky. Margins of pronotum, elytra, and meta-notum pale, hyaline; disk pale brownish. Abdomen with posterior segments bordered broadly brownish, lateral margin with six short blackish bars on each side, legs and cerci pale yellowish, posterior part of abdomen darker. Egg-case cylindrical, whitish, with a very fine dark ridge, scarcely serrate.

	Female.
Length of body	10 mm.
Length of pronotum	2·3 "
Width of pronotum	4 "

Habitat.—Vicinity of Adelaide, South Australia. Two females

(S.A. Museum). Under bark of Eucalypts in scrub-lands. The barren female was captured in April; the other, with egg-case undetached, in July.

LOBOPTERA CIRCUMCINCTA, *sp. nov.*

Pale dusky-yellowish, banded with dark-brown, and pale lateral margins. Head blackish-brown, ocelliform spots, and mouth parts pale; also the antennæ. Pronotum with disk and hindmargin brown, enclosing a pale subrhombic spot; foremargin dark-brown, sometimes obliterated. Elytra lobiform, much exceeding the meso-notum; disk brown. Abdomen with anterior segments pale, their hindmargins dark; posterior segments dark, except the last, which has a pale hindmargin. Supra-anal lamina of male very short, rounded; of female acutely triangular, compressed. Cerci long, terete, hirsute. Underside pale dusky-yellowish, legs whitish.

	Male.	Female.
Length of body	8·5 mm.	9 mm.
Length of pronotum ...	2 "	2 "
Width of pronotum ...	3·5 "	4 "

Habitat.—Kangaroo Island (*Tepper*, April, 1884); Riverton (May, 1887); Mount Bryan East (September, 1887). Two males, two females (S.A. Museum).

The males only appear to possess lobiform elytra, the females to be wholly wingless.

LOBOPTERA UNDULIVITTA, *Walk.* (Brit. Mus. Cat., 144).

"Testaceous, fusiform, smooth, shining. Head with two black stripes dilated towards the vertex. Antennæ piceous, base testaceous. Pronotum with two undulating black stripes not extending to foremargin. (Elytra?) Abdomen with two black stripes, apical part black, or almost wholly black. Supra-anal lamina of male bilobed, emarginate, sides deflexed. Cerci long, flat, lanceolate, tawny. Styles distinct.

Length of body (male and female) ... 15 mm.

Habitat.—New Zealand."

This and the following species have been removed from the genera under which they were placed by Walker, on account of their general characters, as apparent by his descriptions, which agree much better with *Loboptera* than any other, notably the striped pronotum and rudimentary wings.

LOBOPTERA MARGINIFERA, *Walk.* (ibid).

"Yellow, fusiform, smooth, shining. Head with a piceous band on the vertex. Pronotum pale, hyaline, yellow, bordered in the disk by two irregular black stripes, and externally by two

yellow lines. Meso- and meta-notum, also abdomen, bordered pale yellow, with two black stripes laterally. Elytra rudimentary, pale yellow, hyaline. Abdomen piceous beneath, angles acute, hyaline. Supra-anal lamina acutely angular laterally.

Length of body (male and female) ... 18 mm.

Habitat.—King George's Sound, West Australia."

LOBOPTERA PLATYSOMA, *Walk.* (ibid, 111).

"Testaceous, elliptical. Head broad, exceeding the pronotum. Antennæ stout, setulose. Pronotum rounded in front, hind-margin straight, sides pellucid. Elytra much shorter than the body, costa much rounded; transverse veinlets few. Wings pellucid, rudimentary.

Var. B. Abdomen with a black patch on each side near the base. Cerci lanceolate, rather long and slender.

	Male.
Length of body	7 mm.
Length of elytra	2·5 "

Habitat.—West Australia."

TEMNOPTERYX, *Brunner* (Syst. 83, fig. 6).

"Body oblong. Antennæ longer than the body. Pronotum flat, semicircular, leaving the head free. Elytra half the length of the body, truncate, touching in a straight line; scutellum largely exposed, veins not very distinct. Wings as long as the elytra. Tibiæ very spiny, very broad behind, especially with the males. Supra-anal lamina of male transverse, rounded; of female triangular. Cerci eight-jointed."

TEMNOPTERYX OBSCURA, *Saussure.*

Mel. Orth. in Memoirs Soc. Phys. de Genéve, xx., part II., 1870.

Habitat.—India, Samoa. Description not seen.

PARATEMNOPTERYX, *Saussure* (loc. cit.).

Resembles *Temnopteryx*, but the tarsi are not provided with plantuli (arolia).

PARATEMNOPTERYX AUSTRALIS, *Sauss.* (loc. cit.)

Habitat.—Australia. (Zool. Record, Vol. VI., 459, 1870.)

TEMNELYTRA, *gen. nov.* (=truncated elytra).

Body oblong. Antennæ as long as the body. Pronotum flat, semiorbicular. Head free. Elytra subcorneous, semihyaline, extending slightly beyond the metanotum; veins undeveloped, except the main ones, unbranched. Wings none or scale-like.

Femora shortly spined, tibiæ slightly incrassated. Abdomen very flat, nearly alike in both sexes, dorsal segments 8—9. Supra-anal lamina large, almost as long as wide; of the male subtruncate, broadly emarginate, angles rounded; of the female much narrower, subtriangular, arched, triangularly emarginate. Subgenital lamina with long filiform styles. Cerci ten-jointed.

The genus appears to form an intermediate link between *Aphlebia* and *Temnopteryx*, the structure of the elytra appertaining to the former and the general form of body, legs, and genital appendages to the latter. The following synopsis denotes the affinities of this to *Temnopteryx* and the succeeding genus :—

Elytra abbreviated. Wings rudimentary or none.

1. Veins more or less distinct and complete.
   2. Elytra truncate, subquadrangular. Veins complete, simple, more or less parallel.
      TEMNOPTERYX, *Br.*
   2.2. Elytra ovate, rounded. Veins incomplete, sinuate.
      BALTA, *gen. nov.*
1.1. Veins almost obsolete, or very indistinct. Elytra truncate, subquadrangular, transparent.
   TEMNELYTRA, *gen. nov.*

TEMNELYTRA HARPURI, *sp. nov.*

Pale brownish-yellow. Integument of pro- and meso-notum almost transparent. Pronotum rounded in front, straight behind, angles rounded, margin broad, whitish, hyaline, disk brownish, showing outline of body beneath, and marked by a slender brownish line, the hindmargin overlapping the mesonotum considerably.

Elytra of male quadrilateral, truncate, exceeding the metanotum, with numerous impressed dots, with radial and anal vein distinct, latter terminating apparently in the posterior apical angle, margins pale yellowish, disk pale brownish; female wingless. Abdomen of both sexes pale yellowish, above with a paler margin, an interrupted piceous stripe, including black dots; of male beneath black towards the margin and apex, paler elsewhere; of female quite pale with two dark marginal stripes.

	Male.	Female.	Larva.
Length of body ...	15–17 mm.	15 mm.	10 mm.
Length of elytra ...	4·5 "	— "	— "
Length of pronotum...	5 "	4·5 "	2·7 "
Width of pronotum ...	6 "	5·5 "	4 "

Habitat.—Cygnet River, and Karatta, Kangaroo Island.

Two males, one female, and one larva (S.A. Museum).

The insects are diurnal in habit, and were captured on Acacia

bushes in March in November respectively, and were very swift in their movements. The half-grown larva is almost concolorous. The specific name is given as a slight token of gratitude to and in honour of the late manager of the Karatta Station, Mr. W. Harpur, whose ready and disinterested help and hospitality alone enabled me to examine the south-western part of the island (otherwise uninhabited) for several weeks.

BALTA, *gen. nov.* (Anagram).

Body oblong. Antennæ as long or longer than the body. Pronotum flat, semicircular, wider than long, and not covering the head. Scutellum free. Elytra abbreviated, extending to the fifth or sixth segment of the abdomen, costal margin very much rounded, hindmargin nearly straight, apex obtuse; costal vein indistinct or obsolete; radial vein distinct, sinuous, with five branches (one or two forked); ulnar vein with two branches; remainder wholly absent. Wings very rudimentary or none. Tibiæ compressed, not dilated, with long spines. Supra-anal lamina of male transverse, subtriangular, emarginate and deeply incised, lobes rounded; of female much reduced. Cerci long, ten-jointed.

BALTA EPILAMPROIDES, *sp. nov.*

Size small. Obscurely pale yellowish. Pronotum smooth, lateral margin broad, pellucid; disk with medium line indistinct, a short, oblique streak on each side, and several minute brownish dots. Elytra with the veins and reticulations whitish, interspaces brown. Abdomen of female with six undefined brown stripes, hindmargin of several segments with black dots (Epilampra-like), male paler than female, and scarcely marked. Underside pale, lateral margin of abdomen with blackish spots, or wholly dark. Cerci banded with piceous.

	Male.	Female.
Length of body	8 mm.	8·5–9 mm.
Length of elytra... ...	3·3 "	3·3–3·5 "
Length of pronotum ...	2·3 "	2·3 "
Width of pronotum ...	3·3 "	3·5 "

Habitat.—Kangaroo Island (1886), Murray Scrub (1887). One male, three females (S. A. Museum).

The insect are diurnal, and were captured by me in November on Acacia shrubs.

BALTA DISCALIS, *Walker*, sp., Brit. Mus. Cat., 111.

" Black. Head and pronotum thinly punctured. Base of antennæ, a dot between them, and a patch on each side, extending to the border, yellow. Pronotum with anterior and lateral margin rounded, yellow, hindmargin straight. Elytra tawny,

not exceeding half the length of the abdomen. Underside tawny. Abdomen with a yellow stripe laterally above and below.

Length of body (female) 7–8 mm.

Habitat.—Western Australia."

Phyllodromia, *Serville.*

Br., Syst., 88, figs. 7 and 8 ; *Blatta*, auctores.

Body elongate. Elytra corneous, incumbent, concealing the scutellum ; anal vein long, not much curved, terminating about the middle of the hindmargin ; radial vein emitting no branches to the hindmargin, ulnar vein separate at the base, the branches extending longitudinally towards the apex. Wings perfect, ulnar vein undivided, or emitting a few branches to the apex. Abdomen of male lanceolate, with nine dorsal and eight ventral segments ; of female with nine dorsal and six ventral. Supra-anal lamina of male triangular, or subsemicircular ; of female triangular, obtuse, emarginate. Cerci long, 12-jointed. Subgenital lamina triangular, obtuse, styles none or rudimentary.

This is another of the genera into which the original—now altogether abolished—genus *Blatta* has been distributed, and is of wide extent. A large number of species are recorded by Brunner, Saussure, Walker, &c., but not a single one represented in the collection of the South Australian Museum at present. The species of the last-named author are doubtful, and cannot be correctly placed, owing to his defective descriptions, notwithstanding their apparent fulness, and must remain uncertain until determined by comparison with his types, and redescribed.

Phyllodromia Germanica, *Linné.*

"Brownish testaceous. Head very prominent ; face brownish, vertex pale. Pronotum of male oblong, of female transverse, with two brown longitudinal stripes (slightly curved), the space between them reddish testaceous, and distinct from the margin. Elytra concolorous. Wings with ulnar and anal vein entire.

	Male.	Female.
Length of body	13 mm.	11 mm.
Length of elytra ...	11·5 "	11 "
Length of pronotnm ...	3 "	3 "
Width of pronotum ...	3·5 "	4·5 " "

—*Br.*, Syst., 90.

Habitat.—All continents ; its occurrence in Australia, however, requires confirmation.

The species has been described as *Blatta Germanica* by most authors, but also as *B. Asiatica*, Pallas ; *Ectobius*, Stephen ; *Ectobia*, Westwood ; *Phyllodromica*, Fieber.

PHYLLODROMIA AUSTRALIÆ, *Br.* (Syst., 95).

"Testaceous. Head testaceous, with a transverse line; vertex and antennæ black. Pronotum with yellowish fore- and hind-margins; disk brownish, with two dark stripes contiguous in front, space between them of equal width throughout. Wings with the ulnar vein with few branches, all emitted towards the apex. Elytra ferruginous testaceous. Abdomen brownish above, underside streaked brown laterally. Legs testaceous.

	Male.
Length of body	12 mm.
Length of elytra	13 "
Length of pronotum	3·2 "
Width of pronotum	4·2 "

Habitat.—New South Wales."

PHYLLODROMIA SPURIA, *Brunner* (Syst., 96).

"Brownish ferruginous. Antennæ brownish. Pronotum transverse, truncate in front and behind, with two indistinctly bordered stripes continued along the elytra. Margins of pronotum and elytra broadly hyaline. Legs testaceous. Abdomen border testaceous, and with brown lateral streaks.

	Male.
Length of body	9 mm.
Length of elytra	8 "
Length of pronotum	2·2 "
Width of pronotum	4 "

Habitat.—Fiji Islands."

PHYLLODROMIA FEMORATA, *Brunner* (ibid, 101).

"Rusty yellow. Antennæ blackish at the base, otherwise rusty brown, much longer than the body. Pronotum elliptically transverse, truncate in front and behind; disk yellow, lateral margin hyaline, brown behind, with a very narrow yellow margin. Elytra rusty-yellow, with pale margins. Wings brownish black, fore margin ferruginous, veins black. Femora and tibiæ striped blackish at the apex.

	Male.	Female.
Length of body	10 mm.	11 mm.
Length of elytra ...	12 "	11 "
Length of pronotum ...	3 "	3 "
Width of pronotum ...	4·5 "	4·5 "

Habitat.—New South Wales."

PHYLLODROMIA VITREA, *Brunner* (ibid, 109, fig. 8).

"Pale testaceous. Face rusty. Pronotum with pellucid concolorous disk. Elytra straw-coloured. Wings hyaline, with brown transverse veinlets. Abdomen pale, brownish laterally.

	Male.
Length of body	10 mm.
Length of elytra	10 "
Length of pronotum	3·2 "
Width of pronotum	4·8 "

Habitat.—Fiji Islands; Vera Cruz, South America."

PHYLLODROMIA LATIPENNIS, *Brunner* (ibid).

"Testaceous. Head large, brown. Pronotum broad, truncate in front and behind, pellucid, concolorous. Elytra with radial area broad; anal vein sinuate, reaching the hind margin beyond the middle. Wings with apex obtuse, radial vein with few branchlets, other veins very irregular, transverse veinlets not at all parallel.

	Male.	Female.
Length of body	10 mm.	12 mm.
Length of elytra ...	8·5 "	8 "
Length of pronotum ...	3·5 "	3·8 "
Width of pronotum ...	5 "	5·3 "

Habitat.—New South Wales, New Zealand, Ceylon."

PHYLLODROMIA MUNDICOLA, *Walk.* (Brit. Mus. Cat., 101).

"Fawn-coloured above, yellowish beneath. Head ochreous, antennæ black, base yellowish, longer than the body. Pronotum with white margin and median line. Abdomen with a black stripe along each side, hindmargins of segments white. Elytra much exceeding the abdomen, pellucid, with white costal stripe, veins white in the discoidal and anal areas, transverse veinlets numerous. Wings brownish, as long as the elytra.

	Female.
Length of body	7–8 mm.
Length of elytra	16–17 "

Habitat.—Australia."

PHYLLODROMIA CONJUNCTA, *Walk.* (ibid, 103).

"Testaceous. Antennæ pubescent, a little longer than the body. Pronotum narrowed and truncate in front, straight behind, with a broad, pale, lateral margin. Elytra rounded in front, costal area broad, thickly and irregularly reticulate, veins pale testaceous, transverse veinlets numerous, irregular. Wings pale cinereous, veins paler. Cerci very long, piceous towards the apex. Styles rather long, stout. Legs stout, femora with a few stout spines.

	Male.
Length of body	11–12 mm.
Length of elytra	16–17 "

Habitat.—New Zealand."

The position of this and the following two species is doubtful, and they may have to be removed to some other genus. They certainly appear not to belong to *Ectobia.*

PHYLLODROMIA CONTIGUA, *Walker* (ibid, 228).

"Testaceous. Head with two pale brownish bands, one in front of the vertex, the other lower. Antennæ testaceous. Pronotum elliptical, narrow in front, and slightly truncate, lateral margins broadly pellucid. Elytra membranous (excepting the base), much longer than the abdomen ; radial vein forked, transverse veinlets regular. Abdomen with brown spots on each side underneath. Cerci much longer than half the abdomen.

	Female.
Length of body	11 mm.
Length of elytra	14 "

Habitat.—New Guinea."

PHYLLODROMIA SUFFUSA, *Walker* (ibid, 223).

"Ochreous above, pale yellow beneath. Antennæ piceous, base pale yellow. Pronotum truncate in front, transverse, margin broadly pellucid. Elytra rather broad, extending much beyond the abdomen, tapering to the apex; costal margin pellucid, transverse veinlets regular. Wings slightly ochreous, with blackish subcostal stripe for two-thirds of the length from the base. Legs pale yellow. Cerci slender, setose, very long.

	Male.
Length of body	9 mm.
Length of elytra	11 "

Habitat.—New Guinea."

The following references are quoted from "Zoological Record," vols. VI. and IX. :—

PHYLLODROMIA BITAENIATA, *Sauss.* (Mel. Orth., 1870).

Habitat.—Australia.

PHYLLODROMIA SIMILIS, *Saussure* (ibid).

Habitat,—Australia.

PHYLLODROMIA ALBOVITTATA, *Saussure* (ibid, 1873).

Habitat.—New Holland.

APOLYTA, *Brunner* (Syst. 112, fig. 12).

Blatta, Burmeister, Handbk. II., 498, 1839 ; *Ellipsidium*, Sauss., Hist. Nat. Mex., III., 118.

Body convex, oval when immature, flat in adult. Antennæ as long as, or shorter than, the body ; incrassated, hirsute. Pronotum

not covering the head, almost flat, transverse, truncate in front and behind, angles rounded. Scutellum triangular. Elytra with radial vein flexuose, branched; anal vein not curved at the apex. Wings with radial vein forked at the apex; ulnar vein emitting three branches towards the apex. Cerci long, lanceolate.

The genus is entirely restricted to Australia.

The species of this genus are diurnal in habit during all stages moving about the foliage of small trees and shrubs in the bright sunshine of the hottest summer days. They move about very swiftly, fly readily and rapidly, and are very difficult to catch. The larvæ are so different in colour from the adults, that it would be well nigh impossible to assign them rightly for any one not conversant with their habits *in situ*. Moreover, it seems that the larvæ of various species resemble each other much more than the adults.

a. Pronotum pale.

APOLYTA VESTITA, *Burmeister.*

Handb. II., 498; *Br.*, Syst. 112, fig. 10; *Ellipsidium variegatum*, Fabr., *Saussure*, Brit. Mus. Cat. 84.

"Pronotum of the same colour as the body. Antennæ, face, coxæ, femora, tarsi, and abdomen deep black. Vertex, pronotum, elytra, tibiæ, and cerci pale yellowish ferruginous. Apex of elytra brownish. Wings smoky, anterior margin streaked pale yellow. Ventral segments of abdomen bordered white.

	Male.
Length of body	10 mm.
Length of elytra	12 "
Length of pronotum	3·2 "
Width of pronotum	4·5 "

Habitat.—Australia *(Brunner)*; Java *(Burmeister)*."

APOLYTA QUADRIPUNCTATA, *sp. nov.*

Pronotum with broad yellow margin all round; disk pale ferruginous, with two, rather large, oval black spots at the hind angles, and two small round ones in the middle Elytra brownish-orange, veins and veinlets almost white, very distinct, except anal vein, which is deep brown, and irregularly bordered with white; apex blackish. Wings with costal area whitish, remainder blackish, veins pale brownish. Underside as in *A. vestita*. Cerci wholly ferruginous.

	Male.
Length of body	10 mm.
Length of elytra	11 "
Length of pronotum	3 "
Width of pronotum	4 "

Habitat.—Vicinity of Adelaide. One male (S.A. Museum)

Apolyta humeralis, *sp. nov.*

Head, pronotum, elytra, legs (except coxæ), and cerci pale brownish-yellow, antennæ and coxæ brown, the latter with pale margins. Abdomen paler above, black beneath, segments bordered with white. Elytra concolorous, blackish at the shoulders, veins paler than the membranes.

	Female.
Length of body	10·7 mm.
Length of elytra	11 "
Length of pronotum	2·2 "
Width of pronotum	3·3 "

Habitat.—Northern Territory of South Australia (*J. P. Tepper*). S.A. Museum.

The specimen is somewhat battered, but quite distinct from others, conspicuously so by the dark base of elytra and absence of the dark apex. The wings are brownish.

Apolyta pallida, *spec. nov.*

Pale brownish-yellow, almost concolorous, including the legs and underside. Margin of pronotum and costal area of elytra much paler, hyaline. Abdomen above banded brownish, beneath more or less dark-coloured towards the apex, or quite pale. Elytra with the veins and veinlets pale. Wings pale dusky-yellowish.

	Male.	Female.
Length of body ...	10·3–10·5 mm.	8·5–11·5 mm.
Length of elytra ...	10 –11 "	8·3– 9·2 "
Length of pronotum	1·8 "	1·5– 1·9 "
Width of pronotum	3 "	2 – 3·2 "

Habitat.—Mt. Lofty Range, Tanunda, Kangaroo Island, South Australia. Three of the females have the egg-cases still attached, one of which is almost completely extruded, and only held by the membranous support. The case is dull-brown, subtrigonal, keel high, 17 rounded teeth visible. Two males and six females (S.A. Museum).

Apolyta decorata, *spec. nov.*

Head, pronotum, elytra, scutellum, post-scutellum, cerci and legs pale brownish-yellow. Pronotum with very pale translucent margins, disk with two to four minute black dots. Wings pellucid. Elytra with white veinlike lines between the veins, which are yellowish. Abdomen black, above with narrow pale lateral margin, ventrally the segments bordered narrowly with white, except the last, which is pale dusky-yellowish in the male, and piceous in the female.

	Male.	Female.
Length of body	9 mm.	9 mm.
Length of elytra	8·8 "	8·8 "
Length of pronotum ...	1·6 "	1·4 "
Width of pronotum ...	2·5 "	2·6 "

Nymphs and *larvæ*. Body ovate, convex, deep black, shining. Vertex narrowly pale-yellowish. Pronotum transverse, hind angles subacute, margin pale all round, widest of the hind angles, the colour gradually passing from whitish exteriorly to piceous, or red towards the middle. Mesonotum with hindmargin bordered pale, hind angles much produced, broadly rusty whitish, the part between the lobes often interrupted by fine black striæ. Metanotum with pale hindmargin distinctly interrupted, lateral margin brownish. Abdomen with the first four or five dorsal segments distinctly bordered by narrow, elongated white dots, between the rows a narrow yellow line interrupted in the middle, first segment sometimes pale at the base; fifth or sixth segment with two small yellow dots close to the median line; the next segment unmarked; the last with plain white margin. Cerci ferruginous. Underside and legs black, coxæ and hindmargins of ventral segments bordered white. Spines all pale.

	Nymphs.	Larvæ.
Length of body ...	7·5 mm.	3·3–4·5 mm.
Length of pronotum	1·6 "	1 –1·2 "
Width of pronotum...	3·2 "	1·7–2·5 "
Width of abdomen...	4 "	2 –3 "

Adults, nymphs and larvæ were found simultaneously to frequent bushes during daytime, running about the branches and foliage, trying to escape observation by slipping to the opposite side very swiftly when disturbed, or drop to the ground.

Habitat.—Mount Lofty Range, Tanunda, Sandy Creek, Nuriootpa, Willunga, South Australia; Fraser Range, Western Australia. Three adults, two nymphs, seven larvæ (S. A. Museum).

A small nymph of some minute species was taken near Tanunda, which I am at present unable to assign to any species or even genus by name. It is elongated, black. Pronotum rounded in front, with broad, smoky, hyaline lateral margin, frontal margin and hind angles of disk white. Lobes of meso- and meta-notum smoky, former with two small triangular white spots in front, latter with white base. Abdomen with the second dorsal segment, the hind angles of all segments, and the middle of the sixth white. Underside and legs black, vertex and spines pale.

b. Pronotum with disk blackish.

APOLYTA PELLUCIDA, *Brunner* (Syst. 114, fig. 10).

Ellipsidium australe, Saussure (Rev., &c., Mag. Zool., 1864).

"Antennæ, disk of pronotum, apex of elytra, legs, and abdomen black. Vertex, margin of pronotum and elytra testaceous, broadly pellucid. Wings anteriorly testaceous, posteriorly smoke-tinted.

	Male.	Female.
Length of body ...	13 mm.	10·5 mm.
Length of elytra ...	14 "	11 "
Length of pronotum ...	4·5 "	3·5 "
Width of pronotum ...	4·5 "	3·5 "

Habitat.—New South Wales."

Apolyta reticulata, *Sauss.* (Brit. Mus. Cat., 84, 85).

Habitat.—Australia. Descriptions not seen of this and the following two species.

Apolyta reticulata, *Saussure* (ibid).

Habitat.—Australia.

Apolyta gracile, *Butler* (Cist. Ent., X., 294).

Habitat.—Queensland.

Apolyta centralis, *Walker* (Brit. Mus. Cat., 120).

"Black, fusiform, smooth. Head with the fore border, the sockets of antennæ and the palpi dark-red. Pronotum reddish, flat, sides black, deflexed, rounded, foremargin truncate, hindmargin almost straight; disk with a broad, very shallow furrow laterally. Elytra red, subcoriaceous, dark cinereous towards the apex, foremargin black for more than half the length from the base, almost straight; anal furrow (!?) slight. Wings dark cinereous. Abdomen with the disk of underside mostly reddish. Cerci lanceolate, moderately long and stout. Legs piceous, knees and tarsi reddish.

	Female.
Length of body	12·5 mm.
Length of elytra	15 "

Habitat.—South Australia."

Thyrsocera, *Burmeister.*

Handb. II., 498; *Br.*, Syst., 115, fig. 11.

"Antennæ often of two colours—blackish and yellow; base hirsute. Pronotum narrow in front, produced behind, rounded, margin deflected. Middle vein of elytra with the basal branches much angulated and emitted towards the apex. Ulnar vein of wings with two or three branches emitted into the apical margin, but none towards the anal vein. Cerci long, lanceolate spathulate."

The genus is remarkable for the smallness of the anal area

The anal vein is very shortly incurved at the hindmargin. Most of the species known are South and Central American, but several occur also in India and the Malay Archipelago.

THYRSOCERA SOROR, *Brunner* (Syst., 120).

"Small. Antennæ of male wholly black, base not dilated Pronotum small, scarcely produced behind, deep black; margin except in front, pale yellow. Elytra wholly piceous. Legs deep black.

	Male.
Length of body	8·5 mm.
Length of elytra	10 "
Length of pronotum	3 "
Width of pronotum	3·3 "

Habitat.—Celebes."

THYRSOCERA INQUINITA, *Walk.* (Brit. Mus. Cat., 103).

"Black, fusiform, nearly flat, smooth. Head yellow. Eyes very far apart. Antennæ piceous, yellow at the back. Pronotum narrow in front, piceous, with two yellow lines united in front, sides broadly whitish and hyaline, much rounded, hind margin slightly rounded. Meso- and meta-notum, also the base of the abdomen, with a yellow stripe. Abdomen with a slender white margin; hind border of ventral segments white. Cerci long, testaceous. Legs testaceous. Elytra piceous, costa white towards the base. Wings blackish cinereous.

	Male.
Length of body	6·3 mm.
Length of elytra	12·5 " (?)

Habitat.—Australia."

This and the following of Walker's species have been removed to this genus provisionally, as the description appears to agree better than with any other.

THYRSOCERA MARGINIFERA, *Walk.* (ibid, 107).

"Black fusiform, smooth. Head and pronotum thinly punctured. Sockets of the antennæ and foremargin testaceous. Antennæ tawny, blackish at the base, setose. Pronotum with a slender yellowish white margin, fore border truncate, setose, hind border very slightly rounded. Elytra coriaceous, veins slightly elevated, forked at the apex; costal area yellowish white, tapering to apex; anal furrow (? vein) very distinct. Wings blackish. Abdomen piceous, with pale testaceous margin. Cerci, pectus and legs pale testaceous.

	Male.
Length of body	8·3 mm.
Length of elytra	16·5 " (span ?)

Habitat.—Australia."

ISCHNOPTERA, *Burmeister.*

Handb. II., 500 ; *Br.*, Syst., 128, fig. 12-13.

" Body of male oblong, of female rounded. Antennæ twice as long as the body. Pronotum small, orbicular, leaving the head free. Elytra pellucid, veins distinct; radial vein emitting parallel branches ; anal vein ending a little before the middle in the hind margin ; axillary veins 6-8. Wings hyaline, ulnar vein emitting pinnate branches towards the anal vein, and others directed towards the apex. Subgenital lamina of male with long styles. Cerci long, twelve-jointed.

These insects are very agile in their movements, and mostly diurnal in habit in Australia. Some species hunt for their prey among the foliage of shrubs, others are found under loose bark, &c., but few, if any, occur in human habitations. As indicated by the name (thin-winged), the genus is remarkable for the delicate texture of the organs of flight, their colour being chiefly due to that of the veins. The elytra possess apparently no transverse veinlets, but the membrane is greatly strengthened by fenestrate corrugations between the veins, producing a regularly reticulate appearance. The wings, however, have real, although few, transverse veinlets.

(Ischnoptera centralis, Walk. See *Apolyta.)*

ISCHNOPTERA AUSTRALICA, *Brunner* (Syst., 131).

(? *I. marginalis*, Walker, Brit. Mus. Cat. Suppl., 145).

Fulvous ferruginous. Head large, eyes remote. Pronotum almost flat, disk impressed. Wings with foremargin yellowish opaque; apex brownish, radial vein dichotomous, ulnar vein emitting branch " 5 " into the apical border and branch " 3 " towards the anal vein.

	Male.
Length of body	20 mm.
Length of elytra	22 "
Length of pronotum	5 "
Width of pronotum	7 "

Habitat.—New South Wales."

ISCHNOPTERA MARGINALIS, *Walker* (Brit. Mus. Cat., 119).

" Testaceous, smooth. Head and pronotum pale red. Head small, face pale yellow; sockets of antennæ whitish, eyes wide apart. Antennæ tawny, setulose, pale yellow at the base. Pronotum pellucid, slightly deflexed, hindmargin slightly rounded. Abdomen blackish yellow beneath, bordered with whitish. Elytra subcinereous, with a white costal stripe tapering to the apex. Wings blackish, costa white, except near apex.

	Male.
Length of body	16 mm.
Length of elytra	20 "

Habitat.—West Australia."

Ischnoptera circumducta, *Walker* (Brit. Mus. Cat. Suppl., 142).

"Testaceous. Head piceous, with sockets of antennæ, foremargin, and palpi testaceous. Eyes wide apart. Antennæ brown, base testaceous. Foremargin of pronotum and sides rounded, hyaline, pale yellow, hindmargin straight, disk with a large blackish ringlet. Elytra coriaceous, costal area pellucid for three-fourths of the length from the base. Wings brownish. Abdomen beneath with brown spots laterally.

	Male.
Length of body	10 mm.
Length of elytra	12·5 "

Habitat.—Australia."

Ischnoptera annulata, *spec. nov.*

Testaceous, apparently resembling the preceding. Head piceous, face a little paler. Antennæ brownish, setaceous, basal joints pale. Pronotum rounded in front, margins pale all round, disk piceous, with a suborbicular or subtrigonal testaceous spot in the middle, hind margin rounded. Elytra pale dusky yellow, radial vein entire before the middle. Wings very pale, costa near apex narrowly brownish, radial vein unbranched, three series of transverse veinlets. Abdomen pale above and below, with blackish spots laterally. Legs pale. Cerci with dark margins.

	Female.
Length of body	11 mm.
Length of elytra	12 "
Length of pronotum	2·3 "
With of pronotum	3 "

Habitat.—Mt. Lofty Range, Kangarilla, South Australia. Captured in April. Two females (S.A. Museum).

Ischnoptera longiuscula, *Walker* (Brit. Mus. Cat. Suppl., 143).

"Testaceous, elongate fusiform. Head with the vertex and face black. Antennæ brownish, testaceous at the base. Pronotum much longer than half its width, margins pellucid. Elytra narrow, semicoriaceous, the anterior longitudinal veins forked, intermediate distinct. Wings pellucid, anal area with white veins. Abdomen long, pale testaceous.

	Male.
Length of body	10 mm.
Length of elytra	12 "

Habitat.—South Australia *(Walker)*."

There are three specimens, viz., one male and two females, in the S.A. Museum, collected by the Elder Exploring Expedition at Cootanoorina, which agree so much with the above description that I refer them provisionally to this species. They are almost concolorous, pale dusky yellow, the head and face piceous, mouth part yellow, a patch at the inner base of the antennæ whitish to pinkish.

	Male.	Female.
Length of body ...	9 mm.	9–10·5 mm.
Length of elytra ...	11 "	11 "
Length of pronotum	2·2 "	2·3 "
Width of pronotum ...	2·8 "	3 "

ISCHNOPTERA PATULA, *Walker* (ibid, 143).

"Ochraceous, broad, fusiform. Pronotum with foremargin truncate, sides much rounded, hindmargin straight. Legs stout short, femora setose. Elytra semicoriaceous, costa pellucid, some of the veins forked. Wings pellucid, veins white. Abdomen longer than the wings.

	Male.
Length of body	10 mm.
Length of elytra	8 "

Habitat.—New South Wales."

Probably referable to *Apolyta*. The references to the veins, &c., are too vague and unmeaning to decide without inspection of the types.

ISCHNOPTERA LATIRUPTA, *Walker* (ibid, 143).

"Ochraceous. Eyes wide apart. Antennæ piceous, testaceous at the base. Pronotum with a fine median line, and a white stripe laterally inside the pellucid margin; hindmargin straight. Femora setose. Elytra slightly coriaceous, with a broad whitish, pellucid, costal stripe, hind part pale testaceous in the left elytra, pellucid in the right. Wings pellucid. Abdomen as long as the wings, with transverse blackish streaks laterally. Cerci moderately long.

	Male.
Length of body	8·5 mm.
Length of elytra	7 "

Habitat.—New South Wales."

The same remarks apply as to the preceding. The insect may belong to *Temnopteryx*, or allied genus.

ISCHNOPTERA ANASTOMOSA, *spec. nov.*

Pale dusty-yellowish, concolorous. Head with vertex and middle part of face piceous, margin and mouth-parts pale. Antennæ brownish, each joint with a very fine white ring. Elytra semipellucid, radial vein straight, ulnar vein re-anastomosing for a short distance near the middle with the former, and then again separating. Cerci long, lanceolate, 12 joints.

	Female.
Length of body	12 mm.
Length of elytra	12 "
Length of pronotum	2·5 "
Width of pronotum	3 "

Habitat.—Little Para River, South Australia. Under bark in April. S.A. Museum.

ISCHNOPTERA MANICATA, *spec nov.*

Pale brownish yellow. Head with a band between the antennæ, and the lateral margins pale, occiput and a broad stripe down the face brownish or blackish. Pronotum subtrigonal, margins and a triangular space in the disk pale dusky yellowish, disk with two broad, oblique, black stripes laterally, widest in front, and narrowly contiguous; also two oblique short black vittæ behind with a small dot between them. Elytra subcoriaceous, radial vein raised towards the base, narrowly piceous, costal margin narrowly brownish. Wings pellucid, blackish in the middle. Legs pale, except a black patch in front of the fore coxæ. Abdomen with ill-defined brownish transverse bands, interrupted regularly, so as to produce five pale narrow longitudinal lines, margin pale. Underside pale, ventral abdominal segments with blackish spots laterally. Cerci twelve-jointed.

	Male.
Length of body	11 mm.
Length of elytra	12 "
Length of pronotum	2·6 "
Width of pronotum	3·5 "

Habitat.—Bordertown, South Australia. S.A. Museum. Under bark of *Eucalyptus rostrata* in January.

ISCHNOPTERA PARALELLA, *spec. nov.*

Brownish yellow. Head pale, except a brownish band between the eyes and an elongated oblique spot opposite the bases of the antennæ. Latter blackish, base pale. Pronotum almost round, with two straight, broad, piceous, parallel stripes widely apart. Elytra concolorous, radial and ulnar veins parallel, distant. Wings pellucid, veins blackish, anterior area with numerous

transverse veinlets. Abdomen dull brownish, margin pale; underside concolorous. Cerci broadly lanceolate, 12-jointed, pale above, with the margin narrowly black towards the apex, and the underside with narrow pale bands. Subgenital lamina of female with a black dot at the apex.

	Female.
Length of body	9 mm.
Length of elytra	10·5 "
Length of pronotum	3 "
Width of pronotum	4 "

Habitat.—Kangaroo Island in the early part of March. Beverley, Western Australia; February (presented by Mr. J. W. O. Tepper). S.A. Museum.

Ischnoptera contraria, *spec. nov.*

Pale dusky yellowish. Head pale, occiput narrowly pale-brownish, face with two larger oval brownish spots between the antennæ, and three minute ones below them. Last joint of palpi brown. Pronotum almost round, margin almost colourless, dark pale-yellow, with two narrow, oblique piceous stripes irregularly sinuate, wide apart in front near the middle of the disk and close behind, in front of each a small brownish figure composed of three short vittæ resembling an arrowhead directed sideways. Elytra concolorous, radial and ulnar veins parallel. Wings pellucid. Abdomen above very pale, below with short, very slender, black lines at the base of the ventral segment, and beyond them with a row of minute dark dots on each side. Cerci pale.

	Male.
Length of body	13 mm.
Length of elytra	20 "
Length of pronotum	3·2 "
Width of pronotum	3·2 "

Habitat.—Murray Bridge, South Australia. On shrubs of *Aster axillaris*, end of November. S.A. Museum.

Ischnoptera obscura, *spec nov.*

Brownish yellow. Head and face deep-brown, except the pale space near the antennæ. Pronotum almost round, fore and lateral margins narrowly pale, pellucid, disk and hindmargin deep-brown. Elytra subcoriaceous, veins brown, membrane pale, pellucid; radial vein separated from ulnar, blackish towards the base, both veins parallel. Wings pale, pellucid. Abdomen pale above, with dusky lateral spots, darker below as well as the legs. Cerci setose, banded brownish.

	Female.
Length of body	10–12 mm.
Length of elytra	11–12 "
Length of pronotum	2– 2·3 "
Width of pronotum	2·5– 3 "

Habitat.—Norwood, South Australia; Kangaroo Island; Lillimur, N.W. Victoria. Captured in March and April. Three specimens, S.A. Museum.

The specimen from Norwood belongs perhaps to *I. anastomosa*, the radial and ulnar veins anastomosing similarly, although the closed cell is much narrower, but the colour markings are different.

ISCHNOPTERA PUNCTUOSA, *Walker.*

Brit. Mus. Cat. Suppl., 149.

" Cinereous, fusiform, *very minutely punctured.* Head testaceous, face with a black patch, and three anterior black spots. Antennæ piceous. Pronotum *thinly tuberculate, hooded* in front and *extending slightly in front* of the head, rounded before and behind, *sides nearly angular*, a transverse patch on the disk behind. Elytra *with numerous irregular brown dots*, and numerous irregular transverse veinlets. Wings pellucid, with a whitish costal streak, and whitish veins. *Femora unarmed.*

	Female.
Length of body	8 mm.
Length of elytra	10 "

Habitat.—Australia."

Although recording this species under Walker's name here, I do so very doubtfully. On account of the unarmed femora it seems to belong to another section, and, if recognisable, should be removed to the neighborhood of *Panchlora*. It may form the type of a genus, or subgenus *(Pseudo-panchlora)* with the italicised parts of the above description as distinctive characters.

ISCHNOPTERA AUSTRALIS, *Saussure* (Mel. Orth., 27, fig. 17).

Habitat.—Australia.

ISCHNOPTERA FULVA, *Saussure* (ibid).

Habitat.—South Australia.

ISCHNOPTERA TERMITINA, *Saussure* (ibid).

Habitat.—Australia. *(Walker*, Brit. Mus. Cat., 119).

ISCHNOPTERA TRIRAMOSA, *Saussure* (ibid, 2 me. fasc., 1870).

Habitat.—Australia. (See Zool. Record, vol. VI., 459).

III. EPILAMPRIDÆ.

Head depressed. Antennæ setaceous, and shorter than the body, or moderately thick and longer. Pronotum transverse, in winged species produced behind. Elytra coriaceous, horny, or lobiform. Axillary veins, when present, crowded. Wings either perfectly explicate or absent, radial vein much branched, ulnar vein pectinate. Legs long, femora spined. Abdomen in both sexes oval, dorsal segments acute, angular behind. Supra-anal lamina of male quadrate, of female incised with rounded lobes, or entire, broad and round. Cerci shorter than lamina, or scarcely longer. Subgenital lamina of male transverse, with long styles. (The principal distinctive characters are supplied by the supra-anal lamina and the cerci).

Paraphoraspis, *Brunner* (ibid, 163, fig. 18).

(*Phlebonotum*, Saussure, Mel. Orth., I., 13, fig. 8),

"Antennæ setaceous, very slender. Pronotum rounded in front, and slightly rounded or tubercular behind. Elytra convex, base not dilated, apex acuminate or rounded, horny, with veins distinct above. Wings rudimentary or perfect, fore part acuminate at the apex, anterior area coriaceous and with few veins, ulnar vein with pennate branches towards the dividing vein, none towards external margin. Legs slender, femora with distant spines. Abdomen of both sexes dilated; of the male with seven, of the female with eight segments. Supra-anal lamina of male transverse, of female triangularly produced, incised in the middle; ventral segments scarcely constricted, the last segment of female triangular, acuminate, somewhat keeled, with two lateral folds. Cerci very short, dilated."

The distinct veins of the convex elytra and the truncate pronotum are the principal generic distinctions. Two species are described; one *P. pallens*, Serv., from Java and Ceylon.

Paraphoraspis notata, *Br.* (ibid, 164, fig. 18).

"Reddish testaceous. Pronotum small, deflexed laterally. Elytra acuminate, dusted with black, or concolorous, foremargin brown, bordered with pale yellow, at the base and near the radial vein streaked with pale yellow. Wings with the foremargin of the colour of the body, coriaceous, veins deep-reddish anteriorly, radiating veins brown. Abdomen brown above. Both sexes winged.

	Male.	Female.
Length of body	16 mm.	17·5 mm.
Length of elytra ...	15 "	15 "
Length of pronotum ...	4·5 "	5 "
Width of pronotum ...	5·8 "	7 "

Habitat.—Victoria, Australia; Ceylon."

EPILAMPRA, *Burmeister*.

Handbk., II., 594; *Br.*, Syst., 167.

Antennæ setaceous, of half the length of the body or not much more. Elytra leathery or almost horny, shining, veins scarcely conspicuous; anal area crowded with veins. Wings with radial vein much branched; ulnar vein pectinate inferiorly. Abdomen depressed (in the male, often rather convex in the female), in both sexes ovate, dorsal segments produced behind in acute teeth, last ventral segment of male wholly concealed mostly. Supra-anal lamina of both sexes transverse, bilobed. Subgenital lamina of male transverse, rounded, with long styles. Cerci short, many-jointed. Only the males are winged, the larger females possessing only lobiform elytra, which scarcely exceed the mesonotum. In some of the new species described both sexes appear to be wingless, in which case the lobes of the males are longer, and rounded at the apex, while those of the female are truncate, and some even do not attain to these, yet appear to be quite mature, and both might be placed into separate subgenera. Another remarkable circumstance is, that in the larval stages they are paler and much more promiscuously marked than in the adult, the marks becoming gradually obliterated, the description of the larval forms are therefore necessary for complete recognition. The insects live under bark, stones, logs, dead vegetable debris, or bury themselves in *loose* dust or soil by day. The males fly about just after sunset, or earlier on cloudy, dull days, while the females wander about among the grass or ascend low objects. The former are very swift on foot, but do not readily take to their wings; their flight is rather slow and fluttering, resembling that of some large moths. When struck-at in an attempt of capture, they drop and stop suddenly at the first slight cover found, or bury slightly in the dust, if such be there. This species never frequents houses, and appears to be wholly destitute of odour, especially the males.

EPILAMPRA GRACILIS, *Brunner* (Syst., 170).

E. fornicata, Sauss.; *atomifera*, Walker (Brit. Mus. Cat., 69).

Male.—Dirty brownish grey. Face with a broad, black, band between the eyes, nearly divided by a narrow pale line anteriorly. Pronotum subrhomboidal, anterior and lateral margins pale and unmarked; hindmargin pale with eight to ten short, radially arranged, black vittæ; disk pale, with more or less thickly-scattered, irregular black spots, streaks and minute dots, divided by a narrow pale medium line. Elytra pale, with a black streak in front of the radial vein for about one-third of the length from the base, remainder with numerous small blackish dots scattered along the veins, excepting the pale costa. Wings

with the anterior part pale brownish, veins brown, posterior part pellucid; transverse veinlets distant, regular, whitish. Meso- and meta-notum pale, irregularly and indistinctly spotted. Abdomen with the hindmargin of the dorsal segments broadly brownish, ventral segments pale, with a submarginal row of black spots. Supra-anal lamina pale, subrotundate, hindmargin slightly emarginate. Cerci about one-half longer than the lamina. Styles minute.

Female.—Body broadly ovate, much wider behind, light brown, with crowded, minute granulations all over. Pronotum semi-elliptic, hindmargin slightly rounded, colour and markings similar to male, but darker. Meso- and meta-notum with the disk marked by black patches and dots more or less confluent; hindmargin pale, with about 14 short, black streaks; meta-notum somewhat angularly-produced medially and much laterally behind. Elytra subrotundate, slightly exceeding the mesonotum, with a black streak medially, and some black dots behind. Abdomen dorsally with similar marks as thorax, margin indistinctly pale, hind angles slightly produced. Supra-anal lamina entire, rounded, with minute black spots; ventral segments ochraceous, lateral margin black, a row of black, submarginal spots, hindmargin streaked with black, last segments black, with a pale medium spot, and some others, sometimes more or less obliterated along the base. Cerci very short. Larvæ much paler, markings indistinct.

	Male.	Female.	Larva.
Length of body ...	17–20 mm.	16–21 mm.	15 mm.
Length of elytra ...	17–20 "	3–4·5 "	—
Length of pronotum ...	4–5 "	4–4·5 "	5 "
Width of pronotum ...	6–7 "	9–10 "	9 "
Width of abdomen ...	—	13–15 "	11 "

Habitat.—Vicinity of Adelaide, Burra, Gilbert River, South Australia; September to May. S.A. Museum. Port Adelaide, Sydney, Tasmania (*Brunner*).

The above description has been drawn from 10 males, 3 females, and one larva, varying considerably in size, details of colour, &c.; but all show the disk of the closed elytra pale, and otherwise the various markings pass gradually into each other, so that no distinctions could be set up.

Epilampra notabilis, *Walker* (Brit. Mus. Cat., 202)?

Male.—Deep brownish testaceous, resembling the preceding. Pronotum with very pale margin all round, unmarked, except the black striæ behind; disk black, the middle either paler or not, with a testaceous median line and some variable lateral pale marks. Elytra brown, translucent, costal margin broadly pale

testaceous, unmarked, extending nearly to the apex ; humeral streak deep brown to deep black, narrow near base, broad towards the middle, beyond this interrupted by the pale veins ; remainder of area with numerous small, more or less intensely dark spots, apical part with regular, transverse, whitish veinlets ; left elytron wholly opaque and speckled to the apex, the right one with the apical part unmarked and pellucid where covered, limit oblique sinuous. Wings brown or blackish, costal margin opaque, whitish in the middle ; veins deep brown ; transverse veinlets narrowly whitish. Abdomen obscurely testaceous, more or less distinctly banded above with brown. Underside and legs pale, stigmata and spines black. Supra-anal lamina large, entire or slightly emarginate, pale. The insect appears to be almost black, excepting the pale margin, when at rest.

Female.—Blackish, with pale longitudinal bands, obscured and interrupted by black speckles. Head and abdomen marked as in the male ; hindmargin of all segments with short, black vittæ, hindangles straight or slightly produced. Underside of thorax and the legs pale, ventral abdominal segments reddish, with broad black margin laterally, either entire or interrupted by pale spots, or a broad red space at the apex. Supra-anal lamina broad, rounded, entire or slightly furrowed in the middle. Larvæ and nymphs similar to female, paler, and the markings more distinct than in the adults.

	Male.	Female.	Larva.
Length of body ...	17–20 mm.	16–18 mm.	9–15 mm.
Length of elytra ...	20–24 "	3 "	—
Length of pronotum ...	5 "	5 "	3– 4 "
Width of pronotum ...	6– 7 "	7– 8 "	5– 7 "
Width of abdomen ...	7 "	11–12 "	6– 9 "

Habitat.—Ardrossan, Yorke's Pen., Callington, Sedan, Port Pirie, Bordertown, Kangaroo Island: South Australia ; Lillimur, N.W. Victoria. S.A. Museum. Australia *(Walker*, loc. cit.).

I have re-described the species under Walker's name, as it appears to agree fairly well with his description, incomplete as it is, in order to avoid a new name. It is widely distributed, inhabits dry, hot localities, and has the habits of *E. gracilis.*

Epilampra Fraserensis, *spec. nov.*

Male.—Resembling the last. Pronotum without distinct median line, with two oblique, pale stripes parallel to the lateral margins. Mesonotum and scutellum with a blackish transverse band and dots. Elytra much narrower and longer in proportion, with brown blotches (partly confluent with sinuous bands), especially in the anal area. Abdomen above with broad, blackish, transverse bands notably conspicuous in the last segments, and a

lateral row of conspicuous, oval, blackish spots. Ventrally pale yellowish, a marginal row of small round dots, and a double, submarginal row of elongated, oval, blackish spots. Wings blackish.

	Male.	Larva (Everard R.).
Length of body	19 mm.	12 mm.
Length of elytra	24 "	—
Length of pronotum ...	5 "	3·5 "
Width of pronotum ...	7·5 "	6·5 "

Habitat.—Fraser Range, S. W. Australia. Two males *(R. Helms)*, S.A. Museum.

A half-grown female larva from the Everard Range belongs probably to this species also. It differs from those of *E. notabilis* in being much paler, the dark speckles very minute and almost evenly distributed, and not forming blotches or stripes, and the striæ of the hindmargins of the segments being shorter, more numerous, much raised, and dark-coloured. The underside is dusky-yellowish; the margins broadly blackish, except the extreme edge; the submarginal spots rather large, a row of dark oval spots medially, and the hindmargins of the segments with short, dark vittæ, the disk being minutely dark speckled.

Epilampra paula, *spec. nov.*

Male.—Whitish-yellowish. Head with a deep black band in front. Pronotum short, broad, much and regularly rounded behind; margins all whitish, hind border with the usual black vittæ, disk almost uniformly speckled with black. Elytra, with costal area whity-yellowish, broad at the base, tapering to the apex; a short, black, humeral stripe, remainder brown, with some darker indistinct spots. Pectus, legs, and ventral segments of abdomen pale; hindmargin of latter very pale, lateral margins with four dusky spots, a submarginal interrupted black or brown stripe, widest posteriorly with an included white dot on some of the segments, and a slender dark median line. Subgenital lamina rather narrow and long, distinctly emarginate. Cerci blackish beneath.

Female.—Clouded reddish-brown, dorsal thoracic segments dusky-yellowish, with black irregular markings, and the typical vittæ on the hindmargin of all segments. Abdomen above with rather large, black, submarginal spots; ventrally black and brown-speckled laterally, and a slender dark median line.

	Male.	Female Nymph.
Length of body	14 mm.	17 mm.
Length of elytra ...	16 "	4 "
Length of pronotum ...	3·6 "	4·2 "
Width of pronotum ...	6 "	6 "

Habitat. — Ardrossan, Yorke's Peninsula, and Callington, South Australia. S.A. Museum.

This is the smallest species, and easily recognised by the almost total absence of speckles on the elytra, and the dark median line on the underside of the abdomen. Captured in January and February.

EPILAMPRA INQUINITA, *Stăl.* (*Brunner*, Syst., 177).

Epilampra nudiventris, Saussure (Mel. Orth., 2nd fasc. Zool. Record, vol. VI., 1870).

"Chestnut testaceous. Head brownish-black. Labrum testaceous. Antennæ ferruginous. Pronotum flat, black spotted all over; disk black, lateral margin broadly, fore and hindmargins narrowly, testaceous. Male with the foremargin of elytra testaceous, spotted black; disk ferruginous, marbled with brown; streaks near radial vein black, continued to middle. Apex of wings brownish. Female with the elytra, and still more the wings, abbreviate, rounded.

	Male.	Female.
Length of body	28 mm.	31 mm.
Length of elytra ...	28 "	10·5 "
Length of pronotum ...	7 "	8 "
Width of pronotum ...	9·5 "	11 "

Habitat.—Sydney, New South Wales."

Originally this species included, probably, *E. truncata*, *auriculata*, and *grucilis*. Since the date of Brunner's work, Stăl made this species the type of his genus *Molytria* (Recherches, &c., Blattidæ, Svensky Vetenskap Akad., Stockh., Bihang, II., 1-18; see Zool. Record XII., 487, 1877), but as I have not seen that work, I prefer quoting it under the present designation.

EPILAMPRA TRUNCATA, *Brunner* (Syst., 178).

"Chestnut coloured. Pronotum small, scarcely covering the head, testaceous, disk irregularly brownish, somewhat produced behind, bordered all round (margins incrassated), impressed scabrous dots very fine, mostly scattered. Elytra of the female incumbent, sutural (hind) margin a third shorter than the costal, veins distinct, impressed dots very scabrous, brown dots scattered. Wings rudimentary. Abdomen with rugose marginal folds.

	Female.
Length of body...	19 mm.
Length of elytra, costa...	5·3 "
Length of elytra, hindmargin	3·8 "
Length of pronotum	5·5 "
Width of pronotum	8 "

Habitat.—Sydney, New South Wales."

Epilampra Kerandremii, *Le Guillon.*

Rev. Zool., 292, 1841; *Br.*, Syst., 182.

"Cinereous, speckled with brown. Palpi testaceous. Antennæ brown. Elytra cinereous, with 8—10 brown spots arranged longitudinally in two rows. Legs pale brown. Abdomen above cinereous, with 10 brown spots, space between pale brown, segments on both sides exteriorly with obscure spots.

Length of body	36 mm.
Width of body	14 "

Habitat.—Triton Bay, New Guinea *(Le Guillon).*"

Epilampra dilatata, *Brunner* (Syst., 185).

"Brownish. Head blackish brown. Pronotum broad, brownish testaceous, with black dots. Elytra broad, very obtuse at the apex, of similar colour and markings as the pronotum, clouded with brown towards the apex. Abdomen brown; fourth, fifth, and sixth dorsal and all the ventral segments sometimes with longitudinal brownish streaks.

	Female.
Length of body	32 mm.
Length of elytra	27 "
Length of pronotum	8 "
Width of pronotum	12 "

Habitat.—Australia."

Epilampra laticollis, *Walker* (Brit. Mus. Cat., 203).

"Livid. Face and a broad stripe on the vertex piceous. Antennæ red, piceous towards the base. Pronotum with numerous small brown dots, sides semihyaline, hindmargin almost straight. Elytra semicoriaceous, irregularly speckled brown; at and near base of radial vein some black speckles, branches forked. Wings ashy, veins testaceous, along the costa some brown speckles; anal area pale cinerous, veins whitish. Supra-anal lamina bilobed. Cerci piceous, apex tawny.

	Female?
Length of body	34 mm.
Length of elytra	32 "

Habitat.—Richmond River, New South Wales."

If the sex be rightly stated, this species certainly belongs to another genus, on account of the perfect elytra of the female. Said to resemble *E. notabilis* (male?), but to be much larger, the head more concealed by the pronotum, and the wings longer.

Epilampra aspera, *spec. nov.*

Male.—Pale-grey. Head with a broad brownish-black band at the vertex, a stripe extending on each side to the middle of

the face, leaving a whitish patch between them. Antennæ blackish with delicate-pale rings, base pale. Pronotum anteriorly with three slender, black, curved striæ in the disk on each side; also some irregular black spots and points behind. Elytra narrow, apex rounded, pale-grey; radial vein narrow deep black at the base, paler beyond the middle, with thinly-scattered brownish and blackish speckles along the veins. Wings whitish, pellucid. Abdomen above with pale lateral margin, segments with indistinct dusky bands, and brownish, submarginal vittæ. Legs with the exterior margin narrowly brown. Ventral segments with numerous minute asperous points, whitish; a marginal row of minute black dots, and short, submarginal, deep brown streaks, viz., two obliquely placed to each other on each segment; also two small black spots near the median line on the penultimate segment. Supra-anal lamina pale, pellucid, rather deeply emarginate. Cerci slightly longer, testaceous.

Female.—Pale ochraceous. Head with a piceous band at vertex, one across the middle of the face and one across the labrum, the two latter sometimes united in the middle, or outline indistinct. Antennæ brownish or ferruginous. Dorsal segments asperous or rugose, with numerous raised tubercles and impressed dots, many of the former with recurved sharp points. Pronotum nearly straight behind, with pale margins in front and laterally; disk with indistinct, dusky blotches; hindmargin with the typical raised vittae. Elytra lobiform, subacuminate. Meso- and meta-notum, also abdominal segments, broadly but faintly darker behind. Legs with the coxæ marked with black anteriorily. Abdomen with ventral segments bordered brownish behind; fine longitudinal, interrupted bands, formed by dark blotches; lateral margin broadly blackish, and submarginal band of a round spot and an oblique streak. Supra-anal lamina broad, emarginate, with two dusky, inverted semicircular lines. Subgenital plate with four blackish spots, a medial and two lateral blackish lines converging to apex. Cerci very short, pale.

Larvæ similar to female, much paler, and the longitudinal markings more distinct.

	Male.	Female.	Larvæ.
Length of body ...	17 mm.	18–25 mm.	9 –13 mm
Length of elytra ...	20 "	3– 4 "	—
Length of pronotum...	5 "	4– 5 "	2·5–4 "
Width of pronotum ...	6 "	7– 8 "	4·5–6·6 "

Habitat.—Western Plains, The Peak, Angebuckina *(Driffield)*, Yorke's Peninsula, South Australia; Eyre's Sandpatch near Eucla, Western Australia. S.A. Museum. The species differs from all others by the pale colour, and the asperous dorsal surface.

A young larva from North Queensland, presented by C. French, Esq., is also referred to this species.

Epilampra obscura, *spec. nov.*

Female.—Dull reddish-brown, with numerous, fine, impressed dots, and slightly asperous granulations. Head with a brownish or black band at the vertex, sometimes extending to the middle of the labrum. Antennæ pale brownish, basal joints much paler. Pronotum with fore and lateral margins dirty-yellowish, this colour extending to the elytra and metanotum, hindmargin narrowly pale, interrupted by the raised black vittæ ; disk dark-brown, with a narrow reddish median line and paler markings surrounding darker ill-defined spots or dots. Elytra lobiform, short, oval, with a dark medial line and dark impressed dots. Meso- and meta-notum similar to pronotum. Abdomen banded transversely with reddish brown and dusky yellowish, lateral margin darker than the disk, hindmargins with black vittæ. Supra-anal lamina truncate. Ventral segments with larger and smaller black blotches ; subgenital lamina black, except some small reddish spots at the base and a reddish streak at the apex.

	Adult Fem.	Fem. larva.
Length of body	23 mm.	13 mm.
Length of elytra	3 "	—
Length of pronotum ...	5 "	3 "
Width of pronotum ...	10 "	7 "
Width of abdomen ...	15 "	10 "

Habitat.—Northern Territory of South Australia (S.A. Museum). Presented by Hon. Dr. W. Magarey. The larva is without the reddish tints.

Epilampra propria, *Walker.*

Blackish, very shining. Head with a black band at vertex and two reddish or blackish ones across the face. Antennæ pale brownish. Pronotum with distinctly scattered impressed dots, fore and lateral margins dirty yellowish, with black dots, border incurved, narrowly brown ; disk shiningly black, with a short. lurid median line and 2–4 lurid spots near it ; hindmargin alternately black and pale, straight. Elytra of male very long, costa pale yellowish, space before radial vein broadly blackish, remainder dull brown. Wings large, smoky brown, veins black. Elytra of female uniform, apex subtruncate, with a more or less extended black median line and black dots. Coxæ streaked black in front. Abdomen of male pale below except piceous submarginal spots ; of female with very narrow pale lateral margin dorsally, each segment with six small, ill-defined, double

dots, forming as many longitudinal lines; hindmargin with the usual vittæ. Ventral segments very broadly black laterally, confluent at the apex of the abdomen, with some pale spots; disk reddish-brown or ferruginous, with a few black spots; of male pale, except the submarginal piceous spots. Supra-anal lamina broad, rounded, middle wrinkled. Cerci slender, pale. Subgenital lamina of male subquadrate, entire, truncate.

	Male	Female.
Length of body	22 mm.	19 mm.
Length of elytra	22 "	3 "
Length of pronotum ...	5 "	5 "
Width of pronotum ...	7·5 "	8–10 "
Width of abdomen ...	— "	10–13 "

Habitat.—Goolwa, Blakiston, Mannum, Kangaroo Island: South Australia. March to April. S.A. Museum.

The black raised vittæ of the hindmargin of the (female) abdominal segments are remarkably long, and in the spaces above small impressed dots, forming two irregular transverse series, are noticed. As this is probably the species described by Walker as *Polyzosteria propria* from Western Australia, Victoria, New South Wales, and Tasmania, I have retained his specific name

Epilampra atra, *spec. nov.*

Black, shining. Elytra of both sexes lobiform. Head pale, vertex and face brownish; sides, antennæ, and mouth parts dirty yellowish. Pronotum with fore and lateral margins narrowly pale dusky yellowish, dotted with brown; disk more or less clouded with indefined lurid marks. Elytra with costa dirty-yellowish, remainder black, a deep furrow along the radial vein. Wings absent. Abdomen shining black, anterior angles very narrowly yellowish; submarginally with an indefined row of lurid spots or bars when young. Underside and legs reddish-brown; ventral abdominal segments partly with black lateral margins and submarginal rows of oblique elongate spots.

	Male.	Female.
Length of body	23 mm.	25–27 mm.
Length of elytra	3 "	4–5 "
Length of pronotum ...	6 "	6 "
Width of pronotum ...	10 "	12 "
Width of abdomen ...	15 "	15 "

Habitat.—Sedan, Murray Scrub, South Australia. S. A. Museum.

The specimens, one male, and two females, were presented by Mr. F. Rothe, who captured them in December, 1885.

The species differs from all others, besides the colour, in the

absence of perfect wings in the male and the usual row of raised vittæ on the hindmargin of the abdominal segments, but this is not considered sufficient for the establishment of a new genus.

EPILAMPRA MEDIVENTRIS, *Saussure* (Rev. Zool., XVI., 321, 1864; Brit. Mus. Cat., 76).

Habitat.—Tasmania.

EPILAMPRA PECTINATA, *Saussure* (Mel. Orth., II., fasc., 1870).

Habitat.—Australia.

EPILAMPRA IRRORATA, *Thunberg* (Nov. spec., 4, 76; Fabr. Ent. Syst., II., 8; Brit. Mus. Cat., 231).

Habitat.—Australia.

If Walker's references be correct, the name represents *Deropeltis erythrocephala*, Fabr., *Blatta Capensis*, Thunberg.

The above specific name is not cited by Brunner, although the works mentioned by Walker are quoted, and the pages next to his.

OPISTHOPLATIA, *Brunner* (Syst., 198, fig. 22).

"Body oblong. Pronotum with hindmargin straight, or broadly emarginate. Elytra *and* wings *abbreviated or scale-like.* Abdomen very broad behind; of the male flat, of the female rather convex; hindmargin of all segments rugose, with raised streaks. Cerci very small. Last segment of female triangular, broadly sinuate."

The presence of both elytra and wings is the chief distinctive character. Of the four species known, two occur chiefly in Asia and the Malayan Islands, the others in South America.

OPISTHOPLATIA ORIENTALIS, *Burmeister.*

Handbk. II., 482; *Br.*, Syst., 199.

"Red, dorsum black, margin brownish-red. Pronotum with the anterior margin testaceous. Elytra and wings lobiform, acuminate, equal in length, blackish, foremargin red.

	Male.	Female.
Length of body	24 mm.	27–33 mm.
Length of elytra and wings	4·5 "	5·6 "
Length of pronotum ...	7·5 "	8–9 "
Width of pronotum ...	12 "	14–15 "

Habitat.—Australia *(Brit. Mus. Cat.*, 152); India, China, Brazil *(Syst.)*." The home of this species is most likely North Australia, or Queensland; *O. australis*, Burm., inhabits Brazil, not Australia.

IV. GEOSCAPHEUSIDÆ (Earth-diggers). *Fam. nov.*

Antennæ submoniliform, rather stout, scarcely exceeding one-fourth of the length of the body. Pronotum anteriorly arched, truncate, straight behind, wholly concealing the scutellum. Elytra and wings none. Abdomen very broad, oval, dorsal segments acutely angular, two penultimate segments with a retrorse spine on each side, vent covered hermetically by the last segments. Supra-anal lamina of both sexes subtruncate, entire. Cerci very short, thick, apparently inarticulate, partly concealed by a fold of the segment. Subgenital lamina of male subsemicircular; styles none.

The place of this family has already been indicated, see p.

Burrowing is a character well developed among the Gryllidæ (Mole-crickets, &c.), and indicated by a special modification of the forelegs, viz., the short, thick, flat tibiæ, and the long, radiating spines, but I cannot find any references that such habits or modifications have been recorded as occurring among the Blattariæ, and so distinctly exhibited by the individuals of this monotypic family. An approach is made by the EPILAMPRIDÆ, and to a less extent by *Oniscosoma*, a genus of the PANCHLORIDÆ. With these the shortened fore-tibiæ are much incrassated, and armed with long stout spines. The latter are, however, still normally arranged, *i.e.*, in two series, and not differing in this respect from the other groups. In the present instance a great departure from the normal type is noted, viz., the conversion of the forelegs, and especially the tibiæ, into perfect digging implements comparable only with those of the Mole-crickets, the fore-tibiæ being short, broad, and flat, and the long spines arranged digitately in a single series around the margin. A single posterior spinelet denotes the second series. This character, combined with the unique form of the body and the genital appendages have induced me to establish for this species a new genus and family.

GEOSCAPHEUS, *gen. nov.* (*gé*=earth; *scapheus*=digger).

Body broad, oval, thick, coarsely impressed punctate. Head large, rugose. Antennæ moniliform, with joints much thicker than long, about one-fourth of the length of the body, placed in the centre of circular, depressed, whitish areas. Palpi stout, joints subequal. Pronotum transverse; margins slightly incurved, coarsely punctured; foremargin arched over the head; a small, round, depressed area anteriorly, surrounded by a ridge (which is most prominent in front) and separated from the disk by deep furrows; disk tumid in front, finely punctured. Meso- and meta-notum similar, neither excavated nor tumid. Abdomen with eight dorsal segments, very coarsely punctured, hind angles

of the two penultimate segments produced and forming stout, recurving spines. Legs very stout, spines long. Fore coxæ subcylindrical, deeply incised at the apex. Fore femora scarcely as long as the coxæ, incrassated, with three long curved spines near the middle. Fore tibiæ very short, flat, with eight radiating long spines in single series around the margin, besides one or two smaller and movable in the disk. Tarsi very slender, five-jointed, first joint about twice as long as any of the following three ; last longer than the first. Pulvilli very minute or absent. Supra-anal lamina transverse, broad, subquadrilateral, slightly rounded behind in both sexes, narrower in the male. Penultimate segment of male with the hindmargin roundly and broadly emarginate, for the reception of the subgenital lamina. Ventral segments smooth, shining, lateral margins punctured. Styles none.

GEOSCAPHEUS ROBUSTUS, *spec. nov.*

Deep reddish-brown, margins of thoracic segments paler. Mouth parts and palpi black, whitish about the joints. Antennæ blackish. Legs mostly, also the apical part of the spines, very dark, remainder brownish-red. Larvæ smaller, almost wholly black ; dorsal segments of abdomen narrowly dark-brown at the base.

	Male.	Female	Larvæ.
Length of body ...	34 mm.	35 –38 mm.	27 –30 mm.
Length of pronotum...	8 "	8·5– 9 "	6·5– 8 "
Width of pronotum...	17 "	17 –18 "	13 –15 "
Width of abdomen ...	23 "	23 –28 "	19 –20 "

Habitat.—Silverton, New South Wales ; Renmark, South Australia (S.A. Museum).

These singular insects were first brought under my notice by Mr. F. A. Fiveash, who captured a pair at Silverton (in the vicinity of the Broken Hill Mines), and presented them to the S.A. Museum in November, 1886, remarking in his note that they lived in the ground. This was proved by pellicles of red clay still adhering to the legs and body. On November 14, 1891, a small adult female and three male larvæ were sent by Mr. R. H. Q. Simmons from Renmark, the South Australian irrigation colony on the River Murray, near the New South Wales boundary. Nothing is known of their habits, food, &c.

V. PERIPLANETIDÆ.

Abdomen of female with the last ventral segment cleft, forming free valvules. Femora spined.

The family is very numerous in species, and is distributed over the larger part of the surface of the earth, being represented in

Australia by numerous endemic species, besides others of cosmopolitan habitus; indeed it is the largest in Australia.

It may be conveniently divided into two sub-families, viz., A. POLYZOSTERINÆ—(integument more or less corneous and rigid; wings wholly or almost wholly absent)—and B. PERIPLANETINÆ—(integument rather soft and leathery, wings perfect or rudimentary). The first admits again of a natural subdivision into POLYZOSTERIÆ and PLATYZOSTERIÆ, characterisable as follows:—

a. Body broadly oval. Ocelliform spots obsolete. Organs of flight entirely absent. Tibiæ stout, spines stout, short. Abdomen dorsally with prominent stigmatic dots. Supra-anal lamina of female broad, rounded, more or less incised, lobes rounded. Cerci short, depressed. Subgenital lamina of male with short, obtuse styles. POLYZOSTERIÆ (*Anamesia*, *Polyzosteria*).

b. Body elongate oval. Ocelliform spots (two) at base of antennæ more or less distinct. Tibiæ compressed, spines long, slender. Abdominal stigmatic dots not distinct dorsally. Supra-anal lamina of female triangular, emarginate. Cerci as long or longer than lamina (blackish). Subgenital lamina of male with slender acuminate styles.

PLATYZOSTERIÆ (*Platyzosteria*, *Leptozosteria*, *Pseudolampra*, *Knephasia*).

ANAMESIA, *gen. nov.* (Intermediary).

Body broad, *subfusiform* (abdomen distinctly wider than thorax), moderately convex; texture coarse. Pronotum semicircular, hindmargin flexuose (concave laterally, convex in the middle); hindangles *rounded*, or slightly angular. Elytra of both sexes obsolete. Legs *long*, *slender*, notably the last pair; tarsi as in *Polyzosteria*. Supra-anal lamina of male *quadrate* or *subquadrate*, hindmargin slightly and broadly emarginate, or rounded. Cerci straight or sublanceolate, shortly acuminate, in both sexes distinctly exceeding the lamina, apex shortly acuminate. Styles rather long, slender, acute.

The generic name refers to the intermediary form of body between *Geoscapheus* and *Polyzosteria*, and to a certain extent (in other characters) between the latter and *Platyzosteria*.

The following synopsis will denote the characteristic differences:—

a. Body subfusiform (abdomen wider than thorax). Hindmargin of pronotum flexuose, angles more or less rounded. Supra-anal lamina of male more or less quadrate, hindmargin concave or very slightly rounded. Cerci straight, distinctly exceeding the lamina, shortly acuminate. Legs long, slender.

ANAMESIA, *gen. nov.*

a.a. Body elliptical. Hindmargin of pronotum straight, angles acute. Supra-anal lamina of male transverse, hindmargin straight. Cerci lanceolate, scarcely exceeding the lamina. Legs short, more or less incrassated. POLYZOSTERIA, *Burm.*

Anamesia Lambii, *spec. nov.*

Reddish-brown, dorsal surface rough with large, shallow impressed dots, shining. Head brown, ocelliform spots small, indistinct, transversely oval; angles of clypeus pale-brownish, antennæ ferruginous. Pronotum with irregular, broad, low corrugations; hind angles rounded, distinctly elongated. Abdominal segments with coarse impressed dots; angles subacute, not produced; hindmargins of first to fifth segments more or less yellow, of sixth and seventh segment entirely so, eighth with rotundately-produced lobes. Underside and legs reddish to piceous-brown, concolorous. Supra-anal lamina of female subtruncate, margins rounded, serrate; hindmargin yellowish. Cerci with parallel sides, shortly and acutely acuminate, pale-brown.

	Seven Females.
Length of body	29–33 mm.
Length of pronotum	7– 9 "
Width of pronotum	14–16 "
Width of abdomen	18–22 "

Habitat.—Innaminka, Central Australia. S.A. Museum.

The specimens were presented by Mr. W. Lamb, who has at various times enriched the Museum collection with numerous objects of interest procured in a locality which is almost inaccessible for collectors in general, and in grateful acknowledgment the species is named after the donor.

Anamesia Eastii, *spec. nov.*

Ochraceous; dorsal surface with large, shallow, rather distant impressed dots, which are dark-brown; shining. Head black above; face variegated paler, a pale ochreous band between the eyes and the sides of the face; antennæ reddish, base blackish. Pronotum pale, with very few dark dots; lateral margin broad, slightly incurved; disk with indistinct elevations and depressions; hindmargin much less flexuose than that of the meso- and meta-notum, both of the latter black at the base in the middle. Abdominal segments narrowly black at the base, dusky along the hindmargin, more or less yellow in the middle, with numerous red or dark round dots scarcely impressed; angles not rounded, those of segments six and seven slightly and acutely produced. Supra-anal lamina of male quadrangular, angles acute, hindmargin broadly emarginate; of female broad, rounded, slightly truncate, and serrate. Cerci slender, scarcely exceeding the lamina, yellow. Subgenital lamina of male quadrate, deeply emarginate, styles long, slender. Underside ferruginous; coxæ pale, striped, with dark red, femora and tibiæ dark purplish.

	Male.	Female.
Length of body	29 mm.	31 mm.
Length of pronotum	9 "	9 "
Width of pronotum	16 "	18 "
Width of abdomen	18 "	23 "

Habitat.—Central Australia. S.A. Museum.

The specimens were collected by Mr. J. J. East, after whom the species has been named, while accompanying Mr. Tietkens in 1888 in his exploring tour.

ANAMESIA LINDSAYI, *spec. nov.*

Reddish-brown. Head brown; ocelliform spots, upper and lower margin of labrum, cheeks, and palpi pale ferruginous, antennæ dusky ferruginous. Pronotum almost smooth, shining, with small, distant punctures; fore and lateral margins very narrowly yellow, hindmargin only yellow in the middle; disk with large rather irregular corrugations, the most notable being a transverse ridge posteriorly, and followed by a deep depression extending into the mesonotum. Meso- and meta-notum similar, hindmargins broadly dark, slightly bordered behind with yellow. Abdominal segments shining, hindmargins of segments, one to five, broadly dark, with a row of small impressed dots; segments six and seven concolorous, rather rough, angles subrotundate, not produced. Supra-anal lamina of male flat, quadrilateral, subrectangular, much shorter than wide, hindmargin slightly convex, sides and base blackish, a lenticular space in disk ferruginous; of the female subquadrangular, arched, dark brown, concolorous, indistinctly serrate. Legs wholly yellowish ochreous, spines alone dark. Abdomen ventrally dark reddish brown, concolorous. Subgenital lamina of male transverse, hindmargin straight, scarcely emarginate; styles slender, exceeding the lamina, red, apex acute, black. Cerci pale reddish, carinate.

	Male.	Female.
Length of body	21 mm.	26 mm.
Length of pronotum ...	5 "	7 "
Width of pronotum ...	12 "	14 "
Width of abdomen ...	14 "	16 "

Habitat.—Fraser Range, South-western Australia. S.A. Museum.

This species is named after Mr. W. Lindsay, the leader of the late Elder Exploring Expedition, and was collected by Mr. R. Helms in May, 1892, who mentions in a note attached that the natives call it "Kumbumberi." The insects, one male and female, resemble *A. Lambii*, but are much smaller, less rugose, and differently marked.

ANAMESIA FRENCHII, *spec. nov.*

Dark chestnut, margin yellow all round, inner limb scallopod; texture coarse. Head with vertex and face reddish brown, a broad band between the antennæ, cheeks and mouth-parts yellowish, antennæ pale reddish. Pronotum rugulose, finely wrinkled, with distant impressed dots; angles rounded, hindmargin rather convex. Meso- and meta-notum similar, angles produced, hindmargin narrowly dark brown. Abdomen rugulose, angles minutely produced, segments with transverse wrinkles and irregular impressed dots; hindmargin of segment six reddish brown; lateral lobes of segment eight large, rotundate, yellow. Underside dark chestnut, legs ochreous yellow. Supra-anal lamina broad, quadrilateral, angles obtuse, rough, blackish, with a yellowish transverse band in middle. Cerci lanceolate, longer than lamina, yellow. Subgenital lamina of male transverse, hindmargin straight, styles pale, scarcely longer, apex black, inserted at the base.

	Male.
Length of body	28 mm.
Length of pronotum	7 "
Width of pronotum	15 "
Width of abdomen	16 "

Habitat.—North Queensland (S.A. Museum). The handsome specimen was presented by C. French, Esq., F.L.S., the enthusiastic and zealous State Entomologist of Victoria, and has been named in his honour.

POLYZOSTERIA, *Burm.*

Handb. II., 482, 1839; *Brunner*, Syt., 203, 1865. *Periplaneta*, Erichson, Wiegm. Arch. VIII., 247, 1847. Walk., Brit., Mus. Cat., 152, 1868.

Body broadly oval to elliptical, convex above. Pronotum semicircular, straight behind, angles acute. Elytra none, wings none. Legs short, rather stout. Tarsi with first joint as long as the two following ones together. Supra-anal lamina of male transverse, straight behind. Cerci smooth, depressed, lanceolate, usually distinctly longer than supra-anal lamina.

The species of the genus are all diurnal in habit so far as known. The greater number inhabit Australia, a few extending to the Malay Archipelago, Mexico, and West Indies. Of the 22 species described by Brunner only four are extra-Australian. Of the 50 recorded by Walker several have been transferred by me to other genera, and many more may also possibly belong elsewhere. Brunner's subgenus *Platyzosteria* I have ventured to raise to full generic rank and added some other new genera, from all of which *Polyzosteria*, as limited by me, differs widely in form and habits.

Polyzosteria limbata, *Burm.* (*Br.*, Syst., 205, fig. 23).

"Body broadly elliptical, blackish, scarcely bronzy. Margin all round very narrowly incrassated, golden yellow, except the foremargin of pronotum. Pronotum with two impressed dots in the disk. Legs uniformly reddish or piceous.

	Male.	Female.
Length of body	38 mm.	39 mm.
Length of pronotum ...	11 "	12 "
Width of pronotum ...	21 "	22 "

Habitat.—New South Wales ("Very common," *Brunner*). Walker records a *P. limbata*, Charp., from Europe (=*Loboptera limbata ?*), *P. limbata*, Burm., and *P. limbata*, Walker, from "Australia," on pp. 152, 154, and 167 of the British Museum Catalogue; the last is possibly the larva of the second.

Polyzosteria obscuroviridis, *spec. nov.*

Elongate elliptical, *dark metallic greenish*, margin all round narrowly yellow. Head with *two minute ocelliform spots* in front, antennæ pale yellow, basal joints dark. Pronotum cucullate in front, finely rugulose laterally and studded with irregular rows of large raised tubercles; disk nearly smooth medially, laterally with ridges and shallow depressions. Meso- and metanotum, also abdominal segments similar, but less distinctly rugose; hind angles acutely produced. Legs brown above, also in front and the longitudinal half of the underside, remainder pale yellowish; tarsal joints pale at the apex and beneath. Pectus and coxæ pale, varied with brown. Ventral segments with a trigonal metallic green spot on each submarginally, those of the abdomen joined by a broad brown band, or a fine line alternately, the penultimate segment piceous. Cerci very flat, obtuse, yellow. Subgenital plate piceous, inner margin of valvules pale.

	Female.
Length of body	43 mm.
Length of pronotum	12 "
Width of pronotum	24 "
Width of abdomen	23 "

Habitat.—Gawler Range, South Australia (S.A. Museum).

A single female was captured in 1884 by Mr. Andrews, one of the Museum collectors. It differs from *P. limbata* by the absence of the two impressed dots on the pronotum, the texture of the dorsal integument, the bicolorous legs, &c., beside size and outline of body.

Polyzosteria iridicolor, *sp. nov.*

Broadly oval. Face, dorsum, stripes of coxæ and the sub-

marginal spots of the ventral segments dark green and coppery iridescent. Antennæ, palpi, narrow margins and the concave hindborder of the dorsal segments dirty yellowish. Body above finely rugulose, near median line with low, irregular, oblique ridge; median line indistinct. Last ventral segment and subgenital valvules transversely wrinkled, deep brown. Supra-anal lamina arched, scarcely incised.

	Female.
Length of body	42 mm.
Length of pronotum	12 "
Width of pronotum	27 "
Width of abdomen	28 "

Habitat.—Gawler Range, South Australia (*Andrews*, Jan., 1884, in S.A. Museum).

The characters chiefly relied on are the great width of the body, the distinctive texture of the dorsal integument, and the narrow, highly arched supra-anal lamina.

POLYZOSTERIA MACULATA, *Brunner* (Syst., 206).

" Elongate elliptical, much depressed, bronzy. Pronotum about the middle of disk golden tinted. Meso- and meta-notum spotted with gold on the foremargins. Coxæ pale yellow, streaked with purplish bronze. Femora, tibiæ, and tarsi with bronzy purple rings. Abdomen of male narrow, of female ovate, ventral segments pale yellow in the disk. Subgenital lamina of male pale yellow.

	Male.	Female.
Length of body	40 mm.	38 mm.
Length of pronotum ...	12·5 "	12 "
Width of pronotum ...	21 "	19 "

Habitat.—Western Australia."

POLYZOSTERIA ÆNEA, *Burm.*

Handbk., II., 483; *Br.*, Syst., 207.

" Elongate elliptical, greenish bronze. Thoracic segments beneath blackish bronze. Legs reddish brown, spines yellow, apex red. Abdomen with dorsal segments shining at the base, ventral with the hindmargin pale yellow. Subgenital lamina of male bronze coloured.

	Male.	Female.
Length of body	56 mm.	60 mm.
Length of pronotum ...	12 "	15 "
Width of pronotum ...	28 "	21 "

Habitat.—New South Wales (*Brunner*), New Holland (*Burm.*)."

Polyrosteria oculata, *spec. nov.*

Uniformally metallic brownish bronze. Dorsum and legs finely rugulose, with numerous larger, distant, obtuse tubercles arranged in three or four irregular rows on each segment, except the last. Antennæ blackish, more than half the length of the body. Pronotum with a small oval, smooth, brightly metallic spot on each side, which is raised and directed obliquely outward anteriorly, behind which is placed a narrow, short, transverse, dark, mettallic, green line. Abdomen with distinct, subcircular, bluish-black stigmatic spots. Pectoral segments beneath broadly sulphur-yellow, laterally with a narrow dark margin and dark disk. Legs brown, yellow about the joints; fore femora with crowded short spines, middle and hind femora with longer distant spines. Supra-anal lamina much produced, broad, deeply emarginate. Cerci broad, flat, subacuminate, of body-colour above and yellow margin, beneath wholly yellow.

	Female.	
Length of body...	31	mm.
Length of pronotum	9·3	"
Width of pronotum	19	"
Width of abdomen	21	"

Habitat.—Head of South-Western River, Kangaroo Island. S.A. Museum.

A single female was captured by me at the end of February, 1886, although several more were seen. The habit of the species of this genus is entirely diurnal. They hunt solitarily, ascending tall bushes and small trees, where they form conspicuous objects when perched on slender dry twigs, and are visible from considerable distances. When approached, however, they let themselves drop suddenly to the ground and are lost to sight, partly on account of the close agreement of their colouring with that of the ground, and partly through their great nimbleness, which permits them to elude all pursuit usually. They appear to possess no odour. In the specimen of this species the left one of the cerci is only about half as long as the right, although otherwise perfect.

Polyzosteria pubescens, *spec. nov.*

Blackish, partly slightly bronzed. Dorsal surface finely wrinkled, with larger, low, obtuse ridges and tubercles, forming three indistinct rows on each side, besides other rugosities, especially on the thoracic segments, and the whole covered more or less by a dense pubescence of short whitish hairs. Head dark greyish iridescent, punctate, with some yellowish lines or other markings; ocelliform spots indistinctly green or bronze. Mouth

parts and palpi brown varied with yellowish; antennæ pale yellow, basal joints dark brown. Pronotum highly arched in front, foremargin bi-sinuate, narrowly pale yellow, disk rough with several low oblique ridges, hindmargin slightly convex, bordered very narrowly pale yellow, more or less invaded or interrupted by raised, shiningly black striæ, as in all the succeeding segments; lateral margin much incrassated, very narrowly black. Meso- and meta-notum with a prominent oblique ridge midway between margin and middle on each side; median line nearly obsolete. Pectoral segments beneath pale yellow, with numerous dark dots and sinuous lines, margin narrowly pale yellow, and a wider submarginal brown stripe. Coxæ brown, bordered and varied with pale-yellow. Femora brown in front and laterally, remainder yellow. Tibiæ wholly brown, spines pale, with dark tips. Ventral segments of abdomen with pale margins, and broad metallic-green submarginal band; disk of the first four yellow, with one or two brown transverse lines, last two or three wholly dark-brown or black, except the hindmargin. Supra-anal lamina of male subquadrate, scarcely emarginate, narrowly bordered with yellow, and covered with short hair. Subgenital lamina of male black, bordered yellow; styles (also cerci) wholly yellow.

	Male.	Female.	Larvæ.
Length of body ...	30–34 mm.	40 mm.	14–25 mm.
Length of pronotum	10–11 "	11·5 "	4– 9 "
Width of pronotum	20–24 "	25 "	12–22 "
Width of abdomen...	20–22 "	28 "	12–18 "

Habitat.—About the Head of the Great Australian Bight (female, *R. Tate*); Fraser Range, S. Western Australia *(Elder Exploring Expedition)*. S.A. Museum.

The species appears to be unique on account of the body being covered dorsally by a fine dense pubescence only absent along portions of the median regions and the summit of the larger rugosities; in the larval stages it is much less developed than in the adult, or quite absent. The larvæ are also distinguished by the greater distinctness of the black streaks across the pale border of the hindmargins, and the underside being much darker.

Polyzosteria patula, *Walker* (Brit. Mus. Cat., 157).

Broadly elliptical, dull metallic-green; lateral margin of thoracic segments very broad, dull-yellowish; hindmargins of all segments more or less interrupted, dull-yellowish. Dorsal surface finely and irregularly wrinkled, with some larger, rather-deeply impressed excavations on the thoracic segments, the broad margin of these being deeply and distantly punctured. Head of body-

colour, mouth-parts, and area around the bases of the antennæ pale-yellowish; antennæ pale, basal joints darker. Pronotum convex in front, much arched, very narrowly pale-bordered, lateral margin incurved, very narrowly bordered with black exteriorly, disk subtriangularly dark, with a broad semilunar impression in front, and a subtrigonal pit on each side behind; also some smaller lateral impressions; hindmargin rather convex. Abdomen with lateral margins narrowly and uninterruptedly pale, the yellow spots of the hindmargins of segments forming seven interrupted longitudinal bands; hind angles of penultimate segments considerably produced, acute. Underside wholly pale-yellowish; tibiæ with a metallic-green, femora with a brown stripe. Supra-anal lamina of male large, slightly truncate, margin serrated, concolorous. Cerci lanceolate, pale yellow. Styles slender, rather long, acute.

	Male.	Female *(Walker)*.
Length of body	30 mm.	31 mm.
Length of pronotum ...	10 "	—
Width of pronotum... ...	20 "	—

Habitat.—Northern Territory, S.A. *(J. P. Tepper*, 1873, in S.A. Museum); N. Australia *(Walker)*.

This handsome and promiscuously coloured species is here re-described from a male specimen, and agrees fairly well with the description of the female by Walker, who omits (however) many essential characters, which envelopes many of his species in doubt.

Polyzosteria femoralis, *Walker* (Brit. Mus. Cat., 156).

"Blackish aeneous, nearly elliptical, dull. Head metallic green, punctured, sockets of antennæ and foremargin tawny. Palpi testaceous. Antennæ reddish, base piceous. Pronotum nearly semicircular, deeply reflexed laterally and in front, hooded, disk longitudinally rugulose, lateral margin punctured, hindmargin slightly convex, tuberculate. Meso- and meta-notum similar. Abdomen tuberculate, ventrally metallic green, disk piceous, coxæ metallic green, margins testaceous; femora piceous; tibiæ and tarsi pale testaceous. Supra-anal lamina entire, slightly keeled. Cerci short, testaceous. Styles red.

Length of body (male and female) ... 25–27 mm.

Habitat.—West Australia."

Polyzosteria figurata, *Walker* (ibid, 157).

"Ovate, greenish black, dull, densely dotted. Angles of thoracic segments acutely produced. Pronotum rugulose, fore and lateral margins testaceous, much reflected; hindmargin tuberculate. Legs pale testaceous, femora black. Abdomen

with numerous irregular testaceous dots, ventrally with two rows of pale dots. Supra-anal lamina entire. Cerci short, testaceous. Styles black, apex testaceous.

Length of body (female) ... ... 18–21 mm.

Habitat.—West Australia."

Polyzosteria invisa, *Walker* (ibid, 162).

" Elliptical, black, dull, extremely thickly and minutely punctured; beneath metallic green, smooth, more coarsely punctured. Pronotum truncate in front, sides scarcely reflexed, hindmargin slightly undulating. Hind angles of meso- and meta-notum rectangular. Abdomen with a row of impressions on each side, fifth and sixth segment slightly gibbous in the middle, with an impression on each side. Coxæ bordered testaceous. Supra-anal lamina truncate, margins yellow. Cerci fusiform, border and underside yellow. Styles yellow.

Length of body (male) ... ... 30 mm.

Habitat.—Australia."

Polyzosteria Mitchelli, *Angas* (S. Austr., Ill., plate 48, fig. 1).

Broadly to elongate oval, finely wrinkled, dull greyish-blue to greenish-brown; beneath almost uniformly whitish to yellow. Head pale, with a black band uniting the eyes, and continued downwards, the mouth (sometimes reduced or almost obsolete), two dark stripes down the face, often united at the upper end, sometimes joined to the transverse band, or wholly absent. Antennæ of male blackish; of female usually yellow. Pronotum more or less arched in front, semicircular (male) or elliptical (female), lateral margin slightly incrassated, broad, flat; disk with a wider or narrower oblique yellow submarginal stripe, between this and the middle a similar, much narrower and shorter one, and a slight impression or two near the anterior extremity of the latter; hindmargin straight (male) or slightly curved (female), narrowly yellow, hindangles rounded. Meso- and meta-notum similar, hindangles slightly produced, subacute, the inner spots sometimes abbreviated, and with a small brown centre. Abdomen without pale lateral margin (excepting the supra-anal lamina), the inner or submarginal yellow spots continued to, and joining, the pale margin of the lamina (in some varieties contiguous and broad, as those from Eyre's Sandpatch, Eucla, Ooldea; in others much contracted and short as those from Sedan, Fraser Range, or only present to the second or fourth segment); hindmargin pale yellow, equally wide throughout, or wider in the middle, and bordered brownish, as the examples from Ooldea. Supra-anal lamina of male truncate, more or less

angular, shorter than the subgenital; of female much narrower, much arched, slightly emarginate. Cerci lanceolate, blackish blue, apex yellow, exceeding the lamina. Subgenital lamina of male broad, rounded, slightly emarginate; styles rather long, slender, acute. Valvules of female much incrassated. Femora with two dark-brown lines, knees brown, spines small and few. Tibiæ sky-blue to white, spines black, each placed in a round black spot.

	Male.	Female.	Larvæ.
Length of body ...	30 mm.	30–40 mm.	18 –28 mm
Length of pronotum	9 "	10 "	5·5– 8 "
Width of pronotum	18–22 "	18–23 "	13 –18 "
Width of abdomen...	18 "	21–24 "	12 –15 "

Habitat.—Sedan *(F. Rothe)*, about the Head of the Great Australian Bight *(Tate)*: South Australia. Eyre's Sandpacth, near Eucla *(Mrs. Graham)*, Fraser Range, Victoria Desert: Western Australia *(R. Helms*, Elder Exploring Expedition). S.A. Museum. R. Murray Plain *(Angas)*.

This is the most gaudy coloured of all Australian Blatteriæ I have seen, and its adult form is well figured by Angas. The lively colours ornamenting it during life soon fade, and become dull after death, the bright blue changing to whitish or dusky greenish-brown. The markings appear to denote several local varieties, and are most distinct and brightest in the larvæ, as well as the ground-colour. The egg-case is dark-brown, smooth, with a very high obliquely serrated dorsal ridge, the immature specimen in the collection showing 12 teeth so far as exposed. I observed the insects first about October in 1859, in the vicinity of Burra, running and hunting about on the ground, and sheltering themselves when pursued in the dense rigid tufts of *Lepidosperma* and *Xerotes*, from whence they could only be dislodged with conconsiderable difficulty.

The description is drawn up from some 20 odd specimens. Angas attached the name to the figure, but the species appears not to have been diagnosed.

Polyzosteria Bagoti, *spec. nov.*

Broadly oval, dull green, rugose with irregular, low tubercles, margins all round, also the hindmargins of all segments, narrowly dull yellow, with dark dots or transverse striæ. Head iridescent to the bases of the antennæ, beyond shining-brown; antennæ brownish-yellowish, about half the length of the body, fourth basal joint longest. Pronotum arched in front, and the foremargin slightly concave, very broad, somewhat convex behind. Meso- and meta-notum much broader laterally than in the middle, hindangles produced, subrotundate. Thorax longer than ab-

domen, ventrally its margin very broad, pale-yellowish, with numerous flexuose black lines and black dots. Legs and abdomen beneath brownish, varied with blackish bands, patches, and lines. Supra-anal lamina of male broad, short, distinctly emarginate. Cerci broad, ovate, scarcely longer than lamina. Subgenital lamina of male pale, subquadrate, entire; styles lanceolate, almost as long as the cerci.

	Male.
Length of body	14 –16·5 mm.
Length of thorax	9 –10 "
Length of abdomen	6·5– 7·5 "
Length of pronotum	4·5– 5 "
Width of pronotum	13 –13·5 "
Width of abdomen...	12 –13 "

Habitat.—Port Augusta.

Two males of this small but remarkable species were presented to the S.A. Museum by Mr. C. M. Bagot, who captured them. Besides the colour, the shortness of the abdomen and the almost microscopical smallness of the femoral spines are unusual.

Polyzosteria reflexa, *Brunner* (Syst., 208).

(*P. femoralis*, Walker !).

"Elliptical in front, semiorbicular behind, bronze-coloured. Body scabrous above, verrucose. Pronotum with the fore and lateral margins broad and acutely reflexed, golden-yellow exteriorly. Femora red, tibiæ yellow, with black spines. Ventral segments of abdomen dark-brown, concolorous, bronzed.

	Male.	Female.
Length of body	25 mm.	30 mm.
Length of pronotum	9 "	11 "
Width of pronotum	15 "	18 "

Habitat.—Western Australia."

There are four specimens in the collection of the S.A. Museum (locality unrecorded) which agree fairly with the general character denoted in Brunner's and Walker's descriptions, but neither is precise enough to settle the point. I append, therefore, a fuller one based on my specimens, supplementing the former.

Metallic green (male), dull blackish (female), or pale yellowish (larvæ), margins narrowly yellowish; dorsal surface finely scabrous with scattered, elevated, smooth, shining, pale brown or yellowish tubercles and ridges, the latter existing chiefly on the pronotum, less on the meso- and meta-notum, forming various patterns difficult to describe. The abdominal segments have a row of tubercles along the hindmargin and one or more in the middle, the bases in the larvæ being marked with a narrow black or metallic green band. The hindmargins of the male are pale, of the female dark,

the tips of the tubercles black in both sexes. The supra-anal lamina of the male is broad, subquadrate, the hindmargin slightly concave ; of the female rounded and entire. Cerci very short, rather broad, yellow. Coxæ and femora of female reddish brown, concolorous ; coxæ of the male metallic green, femora and tibiæ brown with golden borders.

	Male.	Female.	Larvæ.
Length of body ...	22 mm.	25 mm.	15 mm.

Polyzosteria nobilis, *Brunner* (ibid, 209).

" Rather small, oblong. Bronze-coloured, scabrous verrucose. Pronotum in front and laterally reflexed, external margin black. Legs wholly brownish red. Ventral segments of abdomen testaceous, base brownish bronze.

	Male.	Female.
Length of body	26 mm.	30 mm.
Length of pronotum ...	8·5 "	9 "
Width of pronotum ...	13·5 "	15 "

Habitat.—Western Australia."

Polyzosteria subnobilis, *spec. nov.*

Elongate oval. Very dark bronze above. Head bright bronze, deeply impressed, dotted, with a yellow stripe on each side. Pronotum with a broad reflexed margin in front and laterally, finely and irregularly wrinkled, arched in front and with an acute point ; disk deeply sculptured, with a rather deep sinuous transverse furrow anteriorly, the extremities of which (and some other dots) bright metallic bluish green ; hindmargin straight, angles produced, acute. Meso- and meta-notum similar in texture, nearly equally wide. Abdomen finely punctured, segments one to six with a wider or narrower, smooth, band at the base on each side, acute at each end, and separated or scarcely joined in the middle, in segment seven the band is broadest and contiguous ; two penultimate segments laterally much produced, acute. Supra-anal lamina truncate, base broad, hindmargin much contracted, sides straight. Cerci dark-brown, stout, apex pale. Pectus with very broad, deep metallic green margin, disk pale yellowish, with a lateral triangular blackish green patch on meso- and meta-sternum. Coxæ pale yellowish, with one or two metallic green stripes at the base. Femora brown, or greenish, with few, short, pale spines. Tibiæ blackish brown ; spines pale yellowish, tips black. Tarsi blackish above, brownish below, pulvilli large. Ventral segments of abdomen pale yellowish, stigmatic spots black, a narrow green band at the base, hindmargin narrowly greenish, with some dark dots ; last segment deeply emarginate below the cerci, brown, except margin, also the valvules.

	Female.
Length of body	25 mm.
Length of pronotum	6 "
Width of pronotum	13 "

Habitat.—Karatta (near mouth of Stunsailboom River), south-west coast of Kangaroo Island. S.A. Museum.

This species apparently resembles the preceding, but independent of smaller size, the pale coxæ and the smooth semilunar band of the dorsal segments induce me to consider it of specific rank, the above being such conspicuous characters, that Brunner would certainly not have overlooked or failed to record them if they had deen present in his specimens. The insects hunt on Eucalyptus shrubs, in bright, hot sunshine, and are very rapid in their movements.

POLYZOSTERIA SUBVERRUCOSA, *White* (Grey's Journal, 2nd. Exp. II., 467 ; Brit. Mus. Cat.; 155).

" Apterous, oval, thorax in front semicircular, shrouding the head ; posterior angles sharp, rounded behind, the frontal edge bent slightly back, and yellowish ; the upper surface brown, rather obscure, the surface irregularly raised ; below deep shining pitchy brown. Abdomen yellowish, above sprinkled with dark-brown, the edges of each segment with several small wartlike prominences, the two first segments being also shagreened at the sides ; beneath pitchy brown, segments at the base black, with green reflections ; the femora are pitchy brown, the tibiæ pale yellowish, with black spines ; the tarsi of a deep yellow ; head dark brown, the trophi and a narrow line on the cheeks yellowish ; antennæ somewhat ferruginous. A large apterous species.

Habitat.—King George's Sound, West Australia *(Capt. G. Grey)."*

I have not yet seen the species, of which the above is the unabridged original description, but it appears to belong to this genus without doubt.

The following species, except one, are all described by Saussure in the "*Revue et Magazine de Zoologie,*" October, 1864, and are recorded from " Australia " (most likely the coasts of Eastern Australia). Although inserted here, they may all or the greater number have to be removed to *Platyzosteria.*

POLYZOSTERIA BICOLOR, *Saussure* (Rev. Zool., XVI., 307, Australia.

POLYZOSTERIA PULCHELLA, *Sauss.* (ibid, 308), Australia.
" BIGLUMIS, *Sauss.* (ibid, 305), Australia.
" CONSOBRINA, *Sauss.* (ibid, 306), Australia.
" ANALIS, *Sauss.* (ibid, 305), Australia.
" (ZONIOPLOCA) ALUTACEA, *Stăl.* (Rech. Syst. Blatt.

in R. Svenska Vetanskap Academicus Handl., Stockholm, Bihang II., No. 13).

Habitat.—Australia.

Polyzosteria Sedilloti, *Borm.* (Faune Orth. d'Iles Hawai).
" variolosa, *Borm.* (ibid).

Habitat.—New Caledonia.

The last two species were published by A. de Bormans in the "*Annali del Museo Civico di Storia Naturali de Genova*, vol. XVIII., 1883, but I have not seen the descriptions.

Platyzosteria, *Brunner* (Syst., 204).

Body elongate oval, flat, rather thick ; integument more or less leathery (not rigid) during life. Supra-anal lamina of male quadrate or subquadrate, angular or rounded, truncate or concave behind ; of female subtriangular or rotundate, emarginate, colour mostly black or brown. Habit more or less nocturnal.

Platyzosteria melanaria, *Erichson* (Wiegm. Arch., VIII., 247 ; *Br.*, Syst., 210).

"Shiningly black. Antennæ and tarsi blackish, coxæ with red margins posteriorly. Supra-anal lamina in both sexes triangularly rotundate, emarginate, serrate, and ciliate.

	Male.	Female.
Length of body	29 mm.	33 mm.
Length of pronotum ...	8 "	8·5 "
Width of pronotum ...	11·5 "	12 "

Habitat.—New South Wales ; Tasmania."

The only species before me which fairly agrees with the above (scanty) description, and which I therefore refer to it, exhibits the following differences or additional characters. Lateral margins of thoracic segments, also the legs, more or less deeply brown, pulvilli whitish. Antennæ long, slender, pale brownish or rarely blackish, base surrounded by a circular white area. Abdominal segments with the hind angles acutely produced, lateral margin of the last two finely serrated. Supra-anal lamina of male broad, rotundate, slightly emarginate, scarcely serrate ; of female narrow, longer than wide, deeply emarginate, and the lateral margin conspicuously serrate. Cerci of male lanceolate, a little longer than the lamina, black, apex pale ; of female much shorter. Subgenital lamina of male quadrate, styles prominent, slender, acute.

	Male.	Female.
Length of body ...	32–38 mm.	29–38 mm.
Length of pronotum	7– 8 "	7– 8 "
Width of pronotum...	12–15 "	12–15 "

Habitat.—Adelaide, Gilbert River, Sedan, Kangaroo Island: South Australia; Lillimur, S.W. Victoria. S.A. Museum, 13 specimens.

PLATYZOSTERIA ARMATA, *spec. nov.*

Deep shining brown, finely impressed punctate. Head, antennæ, and legs reddish brown, labrum and palpi black, apex pale, ocelliform spots small, subtrigonal. Pronotum with shallow depressions forming a faint, equal-sided, triangular pit behind. Abdomen with hind angles of segments *very acutely produced as spines*, lateral margin of last segment conspicuously dentate; ventral segments scabrous-rugose at the margin, black; disk smooth, finely punctate, varied with reddish brown. Supra-anal lamina of male triangular, margin straight, entire, deeply and narrowly incised at the apex, the *lobes forming long acute spines*, with a small spine externally at the base; of the female with the margin somewhat rounded, prominently dentate, apex emarginate, the *lobes forming short broad spines*. Cerci obliquely lanceolate, base broad, apex acute, pale. Subgenital lamina of male quadrate, emarginate, scabrous, pale-yellowish at the base; styles long, acute, spine-like; subgenital plate of female acutely triangular, very scabrous, black.

	Male.	Female.
Length of body ...	36 mm.	32--35 mm.
Length of pronotum ...	7 "	8 "
Width of pronotum ...	14 "	14--15 "
Width of mesonotum ...	17 "	16--17 "
Width of abdomen ...	19 "	17--18 "

Habitat.—Fraser Range, Western Australia (*R. Helms*, Elder Exploring Expedition, October, 1891). S.A. Museum.

This large and remarkable species is easily recognisable by the spine-like lateral elongations of the abdominal segments and the spine-like lobes of the supra-anal lamina.

PLATYZOSTERIA RUFOFUSCA, *spec. nov.*

Reddish-brown, coxæ and femora paler reddish, tarsi yellowish-ochraceous. Surface laterally fine scabrous, disk almost smooth. Thoracic segments, with the hind segments much rounded. Abdomen with hind angles shortly produced, sharply angular, lateral margin of last segment slightly and distantly serrate, hind angles of last segments much produced, broad, acute; ventral margin blackish-brown, rather scabrous, disk nearly smooth, reddish to piceous. Supra-anal lamina of female as wide as long, rounded, shortly dentate, not or scarcely emarginate, narrowly keeled. Subgenital valvules black, nearly smooth, subtriangular, obtuse.

	Female.
Length of body	32 mm.
Length of pronotum	8 "
Width of pronotum	13 "
Width of mesonotum	16 "
Width of abdomen	17 "

Habitat.—Gilbert River, S. Australia (*L. Molineux*, May, 1887). S.A. Museum.

This species resembles the preceding in stature and colour, but is much smoother, the hindangles of the abdominal segments much less produced, and the lamina of quite a different form.

PLATYZOSTERIA (*Peripl.*) ATRATA, *Erichson* (Wiegm. Arch., VIII., 247 ; *Br.*, Syst., 219).

"Black, shining. Antennæ, margin of pronotum, tibiæ at the apex and the tarsi red, coxæ posteriorly with a yellow border.

	Male.	Female.
Length of body	17 mm.	23 mm.
Length of pronotum ...	5 "	6·5 "
Width of pronotum ...	9 "	9·5 "

Habitat.—New South Wales ; Tasmania."

PLATYZOSTERIA (*Periplaneta*) ATERRIMA, *Erichs.* (ibid).

"Deep black, shining, much depressed. Antennæ ferruginous. Supra-anal lamina of male with hindmargin straight. 'Resembles the preceding species, but differs in dimension' (*Brunner*).

	Male.
Length of body	12·5 mm.
Length of pronotum	4 "
Width of pronotum	6 "

Habitat.—Tasmania."

PLATYZOSTERIA PUNCTATA, *Brunner* (Syst., 211).

"Small, slender, deep black. Body wholly covered with impressed distant spots. Abdomen with the last segments and the lamina scabrous.

	Male.
Length of body	12·2 mm.
Length of pronotum	3 "
Width of pronotum	4·8 "

Habitat.—Eyre's Sandpatch, near Eucla, Western Australia (*Mrs. Graham*) ; S.A. Museum. New South Wales (*Brunner*).

The single male from the former locality, which I refer to this species, has lost the antennæ, but agrees well in dimensions, &c., with the description. It is, however, less dotted, the

scabrous part more extended, dull black above and below, and the mouth parts (trophi) and legs deep chestnut-brown.

PLATYZOSTERIA PSEUDATRATA, *spec. nov.*

Deep black, shining. Thoracic segments with distant impressed dots. Hindangles of mesonotum slightly, of metanotum considerably, produced, rounded; of the abdominal segments, especially the hindmost, acutely produced, hindmargins finely tuberculate. Legs with the coxæ black, narrowly bordered with yellow; trochanters and femora chestnut-brown; tibiæ and tarsi black, the latter white below. Supra-anal lamina of male subquadrate, dentate, deeply and roundedly emarginate. Cerci wholly black, slightly longer than the lamina. Ventral abdominal segments shining deep-black. Subgenital lamina of male with hindmargin straight, entire, black; styles black.

	Male.
Length of body...	23 mm.
Length of pronotum	6·5 "
Width of pronotum	12 "
Width of abdomen	14 "

Habitat.—Central Australia (from the collection of the late *Fraser S. Crawford).* S.A. Museum.

The species appears to resemble *Periplaneta fortipes*, Walker, but differs in the distantly punctured thorax, &c., and from *P. atrata*, Er., in the absence of the red colour of the legs, &c.

PLATYZOSTERIA ALBOMARGINATA, *Br.* (Syst. 212).

" Black. Antennæ blackish at the lower third, remainder ferruginous. Thoracic segments with white margins. Legs and supra-anal lamina reddish.

	Male. (larvæ?)
Length of body	18 mm.
Length of pronotum	5 "
Width of pronotum	6·5 "

Habitat.—Sydney, New South Wales."

There are one male and two female specimens, undoubtedly adults, in the collection of the S.A. Museum, which I am inclined to refer to this species, but the above description is too meagre for sure identification; a more detailed description is therefore given below, and the varietal name *brunnea* adopted. If the characters should be proved sufficient to separate the two, the latter name might become the specific term

P. ALBOMARGINATA, *Var.* BRUNNEA, *var. nov.*

Black, varied with deep brown in the disk. Antennæ pale ferruginous, basal part black. Pronotum with foremargin brown,

lateral margin (as well as that of meso- and meta-notum) white or pale yellow above and below, narrowly bordered exteriorly with black, very finely rugulose. Wingless. Coxæ and femora blackish brown, tibiæ and tarsi red. Abdomen smooth, lateral margin (incl. of lamina) reddish brown ; in the male submarginal ridgelike incrassated, hindangles acutely produced, spinelike (especially of the hindmost segments), dentate ; in the female scarcely incrassated, hindangles much less produced, lateral margin of last segment finely carinate, entire. Supra-anal lamina of male narrow, subtrigonal, apex keeled and emarginate with two large spines ; of female more rounded, slightly dentate towards the apex, deeply and roundly emarginate. Cerci of male narrow, subterete, much shorter than the lamina, and scarcely exceeding the lateral spines ; of female lanceolate, and a little longer. Valvules imperfectly free.

	Male.	Female.
Length of body ...	23 mm.	25–28 mm.
Length of pronotum ...	6 "	6– 7 "
Width of pronotum ...	10 "	10–12 "
Width of abdomen ...	12·5 "	12–13 "

It is with some diffidence that I insert this species here, as it resembles my genus *Drymaplaneta* very much in aspect, notably the pale margin of the thoracic segments, but the cerci being short in this species, and long in all the species of the above genus, induced me to retain it here provisionally. In fact, it seems one of those confusing intermediary forms that bother the systematist and delight the biologist.

Habitat.—Gilbert River *(L. Molineux)* ; Ravine des Casoars, Kangaroo Island *(Tepper)*: S. Australia; Barrow Range, Central Australia *(R. Helms*, Elder Exploring Expedition). S. A. Museum.

Platyzosteria subaptera, *Brunner* (Syst., 212).

" Black, rather dull, depressed (female ; male convex). Elytra lobiform, only partly free. Penultimate segments of abdomen and supra-anal lamina rugose, margins of both serrulate. Subgenital lamina of male transverse, margin straight, angles acute, styles inserted beside the angles." (Subgenital valvules of female distinctly emarginate at the apex.)

	Male.	Female.
Length of body ...	16–19 mm.	17–21 mm.
Length of pronotum	4– 5 "	4– 5 "
Width of pronotum	6·5–8 "	7– 8·5 "
Width of abdomen	—	9–11 "

Habitat.—Blakiston, Victor Harbour, Monarto : South Australia (S.A. Museum) ; Port Adelaide and Melbourne *(Brunner)*.

PLATYZOSTERIA AVOCAENSIS, *spec. nov.*

Chestnut-brown, shining, with minute impressed dots over the whole dorsal surface, interspersed distantly with larger ones on the thoracic segments. Antennæ blackish at the base, gradually paler towards the apex. Legs dark-brown, long; tibiæ and tarsi black, claws reddish; femora with numerous, rather-long spines. Abdomen smooth in the disk, margins and the two last segments rugulose, hindmargins of all regularly and minutely tuberculate; hindangles, especially of the hinder segments, produced into acute spines, those of the last denticulate laterally. Supra-anal lamina of female very rugose, serrate, and denticulate, slightly emarginate. Cerci lanceolate, much shorter than lamina, apex very acute.

	Female.
Length of body	25 mm.
Length of pronotum	7 "
Width of pronotum	13 "
Width of abdomen	14 "

Habitat.—Avoca, Riverina District of New South Wales.

A female, bearing the egg-capsule, was presented to the S.A. Museum by Miss Cudmore, of the above locality, in May, 1888. The capsule is reddish-brown, 10 mm. long, and 4 mm. in vertical diameter; the ridge has 23 very small teeth, and laterally 10 semi-cylindrical short keels adjacent to the suture, but separate from it, longest in the middle, and only indicated at the ends. The mesonotum exhibits a curious abnormity, viz., a considerable abbreviation of the left margin for the whole width of the segment, showing several rugosities, and at the anterior angle a short free lobe projecting from the underside of the pronotum. The opposite side is quite normal.

PLATYZOSTERIA SCABRA, *Brunner* (Syst., 213).

"Deep black, rather broad and conxex. Abdomen dorsally with elevated dots and streaks, the last segments laterally serrate.

	Male.	Female.
Length of body	27 mm.	31 mm.
Length of pronotum ...	8 "	8 "
Width of pronotum ...	13 "	14 "

Habitat.—Sydney, New South Wales."

PLATYZOSTERIA SCABRELLA, *spec. nov.*

Dull deep-black, lateral margins narrow deep-red, rarely wholly black. Antennæ with the long basal joints black, remainder yellow. Pronotum with more or less numerous, rather large, impressed dots. Meso- and meta-notum rugose with irregular raised asperities. Abdomen asperous with small tubercles along the hind-

margins of segments, and one or more irregular intermediate rows, hindangles produced as acute flat spines, the last segment laterally dentate, and with very large spines. Underside of body and legs wholly black, rarely slightly lurid. Coxæ narrowly bordered with yellow. Ventral segments of abdomen from nearly smooth to scabrous. Supra-anal lamina of male rugose, hindmargin entirely ciliate ; of female rounded, dentate, emarginate. Cerci lanceolate, flat, black, apex pale. Subgenital lamina of male pale reddish or brown, hindmargin concave, lateral angles much and acutely produced. Styles inserted laterally near the base.

	Male.	Female.	Larvæ.
Length of body ...	19–23 mm.	19–22 mm.	14–18 mm.
Length of pronotum...	5– 6 "	5– 6·5 "	3–4·5 "
Width of pronotum ...	8–10 "	9–10 "	6–8 "
Width of abdomen ...	10–12 "	12–14 "	8–9 "

Habitat.—Adelaide, Belair, Largs Bay, and Ravine des Casoars, Kangaroo Island ; South Australia. S.A. Museum.

This species resembles the preceding species, but is much smaller, and the margin is distinctly paler. It is one of the commoner kinds, there being 20 specimens in the collection (eight males, nine females, and three larvæ), most of which were captured by myself from March to June inclusively. At this time they are rather numerous, living concealed by day in cool places, such as dead wood and other vegetable debris, with which they are occasionally brought into towns, but avoid houses, and soon disappear. Their odour on handling is strong, and very disagreeable. In some specimens the texture is much smoother than in others, while in rare cases, the paler markings are almost entirely absent, excepting the antennæ and the tips of the cerci.

Platyzosteria castanea, *Brunner* (System, 214).

" Brownish-chestnut. Body convex in the middle. Elytra lobiform. Supra-anal lamina of male slightly *impressed* in the middle, *angles acute ;* of the female serrulate, sub-emarginate.

	Male and Female.
Length of body	21 mm.
Length of pronotum	6 "
Width of pronotum	9 "

Habitat.—New South Wales."

Platyzosteria pseudocastanea, *spec. nov.*

Resembling the preceding. Legs uniformly reddish-brown, tarsi paler. Supra-anal lamina of male very scabrous, middle arched, margin subrotundate, dentate, emarginate, reddish, the

teeth red; of the female flat, nearly entire. Cerci shorter than the lamina, apex red. Styles minute.

	Male.	Female.	Larvæ.
Length of body ...	17 mm.	17 mm.	14 –15 mm.
Length of pronotum	4 "	5 "	3 – 3·3 "
Width of pronotum	7·5 "	8 "	6·5– 7 "
Width of abdomen	9 "	11 "	8 - 8·5 "

Habitat.—Tanunda and Ardrossan, South Australia. S. A. Museum.

A pair of adults and of larvæ were collected by me in October and November at the above localities. The differences indicated seem to preclude the inclusion of this in the preceding species.

PLATYZOSTERIA TRUNCATA, *Brunner* (System, 217).

"Testaceous-chestnut. Pronotum oblong, reddish-chestnut, lateral margin broadly testaceous. Elytra corneous, subquadrate. sutural margins touching, anal vein impressed. Wings none. Legs testaceous. Abdomen bordered testaceous.

	Female.
Length of body	17 mm.
Length of elytra	4·5 "
Length of pronotum	5 "
Width of pronotum	6 "

Habitat.—New South Wales; New Zealand."

PLATYZOSTERIA NOVA-ZEALANDIÆ, *Brunner* (Syst., 218).

"Reddish-black. Body depressed, oblong, with very fine impressed dots, scabrous. Antennæ as long as body, base black, reddish towards apex. Elytra of both sexes rudimentary, lanceolate, obliquely truncate behind. Supra-anal lamina of the male impressed in the middle, reddish ciliate; of female emarginate. Cerci shorter.

	Male and Female.
Length of body	19 mm.
Length of pronotum	6 "
Width of pronotum	8 "

Habitat. — Williamstown and Tanunda, South Australia *(Tepper).* S.A. Museum. Auckland, New Zealand *(Brunner).*

The specimens before me, which I have referred to this species for the present, exhibit the following variations of details :—The thoracic segments bordered reddish-brown, disk much darker, abdomen black, scabrous. Legs bright-brownish-red, tarsi paler. Supra-anal lamina of male finely dentate, emarginate; of the female more distinctly dentate, slightly emarginate. Cerci red at the apex. Styles of male rather long, red. Somewhat smaller in size.

PLATYZOSTERIA TRIFASCIATA, *spec. nov.*

Deep-brown or black, margin mostly paler, minutely scabrous with rather large depressed dots over thoracic segments Pronotum semicircular, hindmargins of all thoracic segments broadly pale straw-coloured or yellow. Elytra none. Legs and underside black, coxæ bordered yellow. Abdomen concolorous, posterior angles more or less acutely produced, hindangles of segment eight, and the cerci red. Supra-anal lamina of male truncate, black, hindmargin densely ciliate, with tan-coloured hairs, angles with a slender spine; of female sub-semicircular, margins dentate. Subgenital lamina of male subquadrate, slightly exceeding the supra-anal, hindmargin concave, serrate, angles spinose, styles slender, acute, as long as lamina, black; subgenital plate of female short, subtriangular margin entire.

	Male.	Female.
Length of body ...	20–22 mm.	21 –23 mm.
Length of pronotum	5– 6 "	5·5– 6·5 "
Width of pronotum	9–11 "	10 –12 "

Habitat.—Northern Territory of South Australia.

The examples of this species were presented to the S.A. Museum by Hon. Dr. S. J. Magarey, 1886, and consist of eight males and seven females. All are remarkable for the uniformity of their character. The three pale bands render the species easy of recognition.

PLATYZOSTERIA BALTEATA, *spec. nov.*

Small. Shiningly black. Face with minute yellow, ocelliform spots. Antennæ and palpi reddish-brown. Pronotum with small, distant, impressed spots, margins pale yellow. Meso- and meta-notum similar, pale border of hindmargin abruptly terminated by lobes of elytra, wider laterally, narrower in the middle. Elytra lobiform, apex rounded, exterior margin pale. Abdomen with hindangles of segments more or less acutely produced, lateral margins very narrowly brown, hindmargin pale yellow, bordered with brown anteriorly; ventral segments and coxæ bordered white. Legs reddish-brown, tarsi whitish beneath. Supra-anal lamina subconical, finely serrate and slightly emarginate. Cerci black, apex red.

	Female.
Length of body	12 –15 mm.
Length of pronotum	3·5 "
Width of pronotum	6 "

Habitat.—Callington, South Australia. S.A. Museum.

Three females were captured by me in January under decaying vegetable debris. The species appears to resemble Walker's *P. polyzona*, but differs in being much smaller and having lobiform

elytra. It also resembles certain larval stages of *Apolyta* spp. in the type of markings, but otherwise widely removed, and is the smallest probably of the family.

PLATYZOSTERIA LATIZONA, *spec. nov.*

Reddish-brown above and beneath, lateral and hindmargins of all segments broadly ochreous-yellow. Head reddish; ocelliform spots minute; lower margin of clypeus, palpi, and antennæ yellowish. Thoracic segments rugose, with coarse impressed dots. Legs pale yellowish, middle and hind coxæ with a black patch at the base; tibiæ from brownish to blackish-brown, Abdomen scabrous, with numerous small tubercles, hindangles acute, those of the last segments produced as acute trigonal spines. Supra-anal lamina of male broad, quadrate, angular, hindmargin concave; of female tapering, hindmargin truncate, angles rounded, slightly emarginate, and with three minute teeth on each side of the notch, in both sexes yellowish, base black. Cerci lanceolate, blackish, apex pale. Subgenital lamina of male blackish, with paler median line and hindmargin, subquadrate, lateral and hindmargins concave, angles produced as acute spines; styles slender, black. Subgenital plate of female brown, apex black, acute.

	Male.	Female.
Length of body ...	17–21 mm.	22 mm.
Length of pronotum ...	5 "	6 "
Width of pronotum ...	9 "	11 "

Habitat.—Mount Bryan East, South Australia (*Thos. Best*). S.A. Museum.

This is a very handsome species and differs from the following not only in colour, but also in the rugosity of the thoracic segments, &c. It may come near to *P. zonata*, Walker, at least in colour.

PLATYZOSTERIA ARDROSSANENSIS, *spec. nov.*

Dull ferruginous. Head and the underside of the body wholly pale straw-coloured; antennæ dark-brownish, basal joints pale, ciliate. Pronotum thickly studded in the disk with minute reddish tubercles in a pale ground, all margins pale straw-coloured, lateral margins incrassated, a black streak between it and the disk. Meso- and meta-notum similar, base of former mostly narrowly black. Legs pale; tibiæ reddish, with red spines; tarsi more or less black above. Abdominal segments banded, base blackish, middle pale, with red dots, hindmargin dull greyish-olive, shading into a narrow whitish border-line in segments one and five; hindmargin of six and seven broadly yellow, base more on less broadly black, middle band nearly obsolete; hindangles acutely produced posteriorly. Supra-anal lamina quadrate, angles, rounded, base black, hindmargin nearly straight,

finely ciliate; of female conical, rounded, slightly emarginate, varied with black. Cerci of both sexes linear, apex shortly acuminate, bristly. Subgenital lamina of male subquadrate, angular, broadly emarginate, angles blunt; styles slender, with black tips. Subgenital plate of female triangular, concolorous.

	Male.	Female.	Larvæ.
Length of body	15 mm.	18 mm.	14 mm.
Length of pronotum ...	4 "	6 "	4–5 "
Width of pronotum ...	7 "	9 "	7–8 "

Habitat.—Ardrossan (Yorke's Peninsula), South Australia. S.A. Museum.

A pair of adults and two female larvæ were captured by me towards the end of November under stones; a young, very pale male larvæ from Nalpa, Lower River Murray (presented by Dr. J. E. Stirling), appears to belong also to this species, although somewhat different.

PLATYZOSTERIA LIGATA, *Brunner* (Syst., 220).

Cosmozosteria ligata, Stăl, Rech. Blatt., 1877.

Reddish-chestnut, wholly bordered with pale-yellow. Wingless. Abdomen of male dilated, depressed, hindangles obtuse. Supra-anal lamina of male transverse, hindmargin straight, entire. Subgenital lamina produced, in the middle triangularly emarginate, lobes acute angular, lateral margins sinuate; styles very long, inserted at base.

	Male.
Length of body	18 mm.
Length of pronotum	6 "
Width of pronotum	9·5 "

Habitat.—Port Curtis, Queensland."

Not having seen Stăl's definition of the genus, I prefer recording the species under Brunner's name. It may perhaps become advisable to unite all the conspicuously-banded species in a separate genus.

PLATYZOSTERIA *(Polyzosteria)* BIFIDA, *Saussure.*

Mel. Orth., in Memoires Soc. Phys. de Genéve, 1873.

Habitat.—Queensland

Description not seen.

PLATYZOSTERIA LATERALIS, *Walker* (Brit. Mus. Cat., 154).

"Black, convex, elliptical, very thinly punctured, lateral margins dark-red; beneath piceous, shining, and thinly punctured. Head piceous; antennæ black, stout. Pronotum with an ochraceous point in front, and a broad, oblique streak laterally and anteriorly. Meso- and meta-notum with an ochraceous spot

on each side near foremargin, hindangles hardly elongated. Legs red, rather stout, coxæ bordered with yellow. Abdomen tuberculate above, laterally with ochraceous spots. Supra-anal lamina slightly emarginate. Cerci lanceolate, slender, apex red. Styles distinct. Female larger than male.

Length of body (male and female) 15–23 mm.

Habitat.—Australia."

Probably belonging to *Periplaneta.*

The descriptions of this and following species of Walker are abbreviated, and the details re-arranged.

PLATYZOSTERIA FERRUGINEA, *Walker* (ibid, 158).

" Ferruginous, convex, elliptical, extremely minutely punctured, red beneath. Pronotum nearly semicircular, with some large marginal punctures, and an oblique yellow streak on each side anteriorly. Meso- and meta-notum thinly and largely punctured, the former with a testaceous dot on each side near foreborder; latter testaceous laterally, hindangles slightly produced. Legs red, posterior coxæ bordered black and pale yellow. Abdomen slightly tuberculate, lateral margins dark-reddish. Supra-anal lamina emarginate. Cerci lanceolate, moderately long. Styles distinct.

Length of body (male) ... ... 20 mm.

Habitat.—Australia.

PLATYZOSTERIA ZONATA, *Walker* (ibid, 159).

" Piceous, elongate-oval, convex, very thickly and finely punctured. Pronotum with a luteous border, widest opposite the hindangles. Meso- and meta-notum with hindmargin luteous, widest laterally, hindangles not produced. Legs stout, coxæ bordered yellow. Abdomen wider than thorax, roughly punctured, Supra-anal lamina truncate, angles acute. Cerci stout, wholly red, or only at the apex. Styles rather long.

Length of body (female) ... ... 18–23 mm.

Habitat.—Port Essington, North Australia.

PLATYZOSTERIA POLYZONA, *Walker* (ibid, 159).

Piceous, broad-oval, convex, smooth, shining. Head tawny, with a piceous spot on the face; antennæ tawny at the base. Pronotum with a narrow ochraceous border, and a few punctures. Meso- and meta-notum, also abdominal segments, ochraceous bordered laterally and behind. Abdomen piceous beneath at the apex. Supra-anal lamina of female entire (?). Cerci, short, broad, lanceolate.

Length of body (female) ... ... 27–29 mm.

Habitat.—Western Australia.

PLATYZOSTERIA QUADRIFASCIA, *Walker* (ibid, 160).

Deep black, oval or fusiform, very convex, very thickly and minutely punctured, smooth, shining. Head thinly punctured. Pronotum with fore and hindmargins ochraceous. Meso- and meta-notum with hindmargins ochraceous, angles scarcely produced. Coxæ bordered with yellow. Abdomen roughly punctured, hindmargins of segments six and seven slightly and acutely produced. Supra-anal lamina serrate. Cerci lanceolate

Length of body (male and female) ... 19–23 mm.

Habitat.—Australia.

PLATYZOSTERIA PECTORALIS, *Walker* (ibid, 160).

"Black, elongate oval, convex, shining, very thinly punctured. Head with a luteous dot adjoining the sockets of the antennæ. Pronotum irregularly bordered luteous in front and behind. Meso- and meta-notum with luteous hindmargins widest laterally, angles hardly elongate. Pectoral segments bordered pale yellow. Abdomen piceous, thickly punctured. Supra-anal lamina truncate, with a subapical spot on each side. Cerci tawny, moderately long. Styles well developed.

Length of body (male) ... ... 20 mm.

Habitat.—Victoria River, North Australia.

PLATYZOSTERIA TARSALIS, *Walker* (ibid, 162).

"Black, elongate oval, convex, smooth, shining. Head with ocelliform spots, sockets of antennæ and frontal margin tawny; antennæ dark red, basal part black. Pronotum very thinly punctured in the disk, also with an indistinct, scutcheon-shaped figure, sides minutely tuberculate. Meso- and meta-notum similar, angles not produced. Elytra slightly indicated. Coxæ and femora mostly dark red, the former bordered with yellow, tarsi tawny towards the tips. Abdominal segments laterally tuberculate, smooth in the disk, segments six and seven wholly tuberculate. Supra-anal lamina tuberculate, hindmargin emarginate, serrate, beneath dark red in the disk. Cerci nearly linear, rather slender. Subgenital lamina tawny.

Length of body (female) ... ... 26–29 mm.

Habitat.—New South Wales.

PLATYZOSTERIA *(Chalcolampra)* CUPREA, *Sauss.*

Mel. Orth. V., fig. 3; Brit. Mus. Cat., 143.

Habitat.—King George's Sound and Swan River, West Australia.

Description not seen.

Leptozosteria, *gen. nov.*

Etymology :—*Leptos*=thin ; *zostron*, a girdle.

Body very flat and thin, elongate. Integument soft. Supra-anal lamina of male triangular, terminating in an acute apical spine. Colour pale, with dark bands.

The form and termination of the supra-anal lamina appear to be quite exceptional among the Blattariæ. Similarly unusual in the related genera is the pale ground-colour with the bands dark, instead of the reverse, which is the usual coloration. I have therefore considered it advisable to establish the genus provisionally for the reception of the single species until further material offers a better base for its final disposition.

Leptozosteria prima, *spec. nov.*

Elongate oval, yellowish. Head dark dusk-brown, ocelliform spots yellowish, very small. Pronotum elliptical in front, disk with a black quadrilateral figure, widest anteriorly, extending along the hindmargin, and including a yellowish four-sided space. Meso- and meta-notum similar, with a very narrow brown marginal line, hindangles rounded, scarcely produced. Elytra none. Legs brown, very flat, coxæ bordered pale. Abdomen above with the hindmargins of segments one to six black or dark-brown, segment seven paler, angles produced, acute, lateral margin of the last two segments finely serrate ; ventral segments piceous, laterally dark, disk paler. Supra-anal lamina dark-brown. Cerci slightly longer than lamina, gradually acuminate. Subgenital lamina of male with the styles stout at the base, remainder slender, acute.

	Male.
Length of body	29 mm.
Length of thorax	15 "
Length of abdomen	14 "
Length of pronotum	8 "
Width of pronotum	12 "
Width of abdomen	15 "

Habitat.—Cordilho Downs, Central Australia. S.A. Museum. This fine specimen was captured and presented by Mr. F. Archer in August, 1889.

Pseudolampra, *gen. nov.*

Body fusiform (narrow in front, broad behind), very convex above, more or less rugose, with impressed dots. Pronotum elliptical, hindmargin concavo-convex or nearly straight. Elytra and wings none. Legs long, slender ; tarsi elongated as in *Polyzosteria*. Supra-anal lamina of male transverse, almost

straight, densely ciliate. Cerci ciliate, more or less depressed, sublanceolate, distinctly longer than the lamina.

The species comprised in this genus resemble the females of *Epilampra* very much in shape and colour, and also in the more or less united valvules of the females, but differ very much in the two sexes being without a trace of elytra or wings. Nearest to them in general resemblance come some of the conspicuously-banded species of *Platyzosteria*, like *P. balteata*, *Ardrossanensis*, &c. I have therefore placed them here provisionally, though perhaps a better position could be found. The systematic position of this new genus is indicated in the synopsis, post p.

The generic name is an allusion to the resemblance mentioned above. The three species possess a type of colouring peculiar to them, and characterised by the double pair of light and dark bands of the abdominal segments.

PSEUDOLAMPRA PUNCTATA, *spec. nov.*

Yellow to ochraceous. Head brown; ocelliform spots, base of clypeus, basal joints of antennæ and the palpi reddish-yellow; antennæ slender, ciliate, blackish, much longer than half the body. Pronotum slightly truncate in front, laterally with numerous small, deeply-impressed dark dots; disk with numerous brownish-red, irregular spots and streaks arranged in a circular area, and disposed radially; hindmargin broadly dark-olive, much wider laterally and extending to the sides, or more or less displaced by the yellow ground-colour. Meso- and meta-notum similar, hindangles moderately produced, obtuse. Legs and underside reddish-brown, coxæ bordered pale-yellow, tibæ and tarsi mostly dark-brown. Abdomen yellowish above, with numerous red impressed dots, angles obtuse, not produced; hindmargin very broadly dusky olive, sometimes absent in segments six and seven; ventral segments two to five with a broad greenish-olive band bordered very narrowly with yellow anteriorly, segment seven concolorous, segments seven to eight with the hindmargin broadly blackish. Supra-anal lamina and cerci of both sexes ochre-yellow. Subgenital lamina of male subrotundate, broad, hindmargin broadly yellow, entire; styles ochre-yellow; valvules deep reddish-brown.

	Male.	Female.	Larvæ.
Length of body ...	27 mm.	30 mm.	23 mm.
Length of pronotum	7 "	8 "	6 "
Width of pronotum...	12 "	12 "	10–11"
Width of abdomen ...	14 "	15 "	13 "

Habitat.—Between Victoria Spring and the Fraser Range (*R. Helms*, Elder Exploring Expedition), West Australia. S. A. Museum; an adult and a larval pair were obtained in October, 1891.

The larvæ are much paler than the adults, and the markings less defined, excepting the minute dark dots.

PSEUDOLAMPRA ROTHEI, *spec. nov.*

Ochreous-yellow. Head pale, with a dark dot between the antennæ and another on the clypeus; antennæ blackish, basal joints pale. Pronotum nearly smooth, fore and lateral margins broad, not dotted, disk circular, with a small, undotted, almost central patch from which radiate black, variously shaped and curved streaks and spots, which are unsymmetrically arranged; hindmargin dusky olive-green, very broad laterally, often replaced partially by the yellow body colour. Meso- and meta-notum similar, the black spots of the disk either separated in two curves, or more or less irregularly confluent, sometimes greatly preponderating over the ground-colour; hindmargin greenish-olive, very broad laterally, sometimes occupying the whole side. Underside black. Coxæ black in the young, partly brown in the adult form, all bordered with white; femora and tibiæ yellowish-brown, tarsi darker. Abdominal segments all banded, base narrowly black, hindmargin greenish-olive to pale-yellow, between them a narrow ochreous band near the base with a row of small black dots and a broader dark band; ventral segments, except the last two, wholly black, base of penultimate black, remainder ochreous yellow, unmarked, all bordered pale. Supra-anal lamina of male quadrilateral, narrower behind, ochreous-yellow. Cerci deficient in all specimens seen. Subgenital lamina of male ochreous, concolorous (plates of female black at the base); styles stout, short, acute.

	Male.	Female.	Larvæ.
Length of body ...	23 mm.	23 mm.	15–17 mm.
Length of pronotum...	5 "	6·3 "	3– 5 "
Width of pronotum ...	8·5 "	10 "	6– 8 "
Width of abdomen ...	12 "	13·5 "	8–11·5 "

Habitat.—Sedan (Murray Scrub), South Australia.

The species has been named after Mr. F. Rothe, who collected and presented the samples to the S.A. Museum, besides many other interesting specimens. One pair of adults, and two pairs of larvæ were examined.

PSEUDOLAMPRA ORNATA, *spec. nov.*

Shiningly deep-black above and beneath. Head black; labrum, palpi and a triangular mark below each eye pale brownish-yellow; antennæ dull blackish, basal joints pale brownish-yellow. Pronotum finely wrinkled with a few small, distinct, impressed dots laterally; all margins narrowly yellow. Meso- and meta-notum similar, hindangles scarcely produced. Legs pale reddish

coxæ bordered white. Abdomen with lateral and hindmargins of all segments narrowly yellow, segments two to six with a narrow anterior band dotted black, and irregular borders yellow, interrupted (at least in the middle); ventral segments bordered narrowly white, last one concavely brownish-yellow behind; valvules of female black. Supra-anal lamina narrower behind, angles rounded, emarginate, base narrowly black, remainder yellow. Cerci slender, subconical, much shorter than the lamina.

	Female.
Length of body	23 mm.
Length of pronotum	7 "
Width of pronotum	10 "
Width of abdomen	13 "

Habitat.—South Australia (precise locality not recorded). S.A. Museum.

Knephasia, *gen. nov.*

Etymology:—*Knephas*=dusky, referring to colour.

Elongate-oval to subfusiform, very convex, very *rugose*, with minute *raised tubercles*. Pronotum subsemicircular, lateral margins *incrassated*, angles *acute*, hindmargin quite straight. Elytra or wings none. Legs short, rather stout, femora thickly spined, tarsi very slender. Supra-anal lamina of male rounded, very slightly emarginate, glabrous. Cerci lanceolate, ciliate, slightly exceeding the lamina. Subgenital lamina of male broad, transverse, slightly emarginate, ciliate; of the female valvate. Monotypic.

In outline the genus resembles Brunner's figure of *Derocalymma dispar*, but is even removed from the division to which this belongs on account of its spinose femora. It is easily distinguished from all others by its peculiar dorsal texture, narrow, elongate form, short abdomen, and the form of the supra-anal lamina of the male. Both sexes being wingless, and the female possessing valvules, removes the genus from the *Epilampridæ*.

The following synopsis represents roughly the relationships of this and some other new genera to certain others of prior date: –

1. Femora spined.
2. Abdomen of female with last ventral segment valve-like. Wingless or elytra perfect, lobiform or absent.

Periplanetidæ.

3. Body very convex, elongate or fusiform. Wingless (resembling *Epilampra*).
4. Body with impressed dots. Pseudolampra, *gen. nov.*
4.4. Body with raised tubercles. Knephasia, *gen. nov.*

3.3. Body more or less flat, broadly or elongate oval.
4. Cerci as long, slightly longer or shorter than the lamina.

a. Elytra none. Integument rigid.
b. Legs short, stout. *Polyzosteria*, Burm.
bb. Legs long, slender. *Anamesia*, gen. nov.
aa. Elytra lobiform or more rarely absent. Integument softer.
c. Black or brown, bordered or banded pale, convex. *Platyzosteria*, Brunner.
cc. Pale, bordered or banded dark, flat. *Leptozosteria*, gen. nov.

4.4. Cerci much longer than lamina. Elytra and wings present, rarely absent. PERIPLANATA, *Burm.*

KNEPHASIA MEDILINEA, *spec. nov.*

Dusky-ochreous to pale-yellowish, with very numerous, minute, dark tubercles obscuring the ground colour. Head pale yellowish or tawny, with numerous black dots; antennæ and palpi very slender, long, pale yellowish, the former finely ciliate. Pronotum reddish tawny, lateral margins narrowly yellow, interiorly bordered by an ill-defined dusky stripe, a black median line from near the hindmargin extending to segment seven, gradually widening hindward. Meso- and meta-notum with hindangles slightly produced. Legs and underside pale-yellowish, with numerous black dots, margins of pectus broadly black. Abdomen short, broad in the female, pale at the base, hindmargins dusky, on each side of the dark median line an ill-defined, interrupted, paler stripe; angles increasingly produced to seventh segment, acute, a black, triangular spot on both penultimate ventral segments. Supra-anal lamina of both sexes concolorous (except the dark tubercles). Cerci of male longer than the lamina; of female shorter, black, apex yellow. Styles of male slender, much longer than the lamina.

	Male.	Female.
Length of body... ...	15 mm.	15–18 mm.
Length of pronotum ...	4 "	5 "
Length of abdomen ...	7 "	7– 9 "
With of pronotum ...	7 "	7– 8 "
Width of abdomen ...	8 "	9 "

Habitat—Sedan, South Australia (*F. Rothe*, three females); Lillimur, N.-W. Victoria (*A. Molineux*, one male); Northern Territory of S.A. (*Hon. Dr. S. J. Magarey*). S.A. Museum.

All the specimens are remarkably uniform, except that the male is much paler and brighter in colour, notwithstanding the wide distribution of the species.

PERIPLANETA, *Burmeister.*

Handb. II., 502; *Br.*, Syst., 221.

" Body oblong, flat above. Pronotum semiorbicular, anteriorly,

rotundate behind. Elytra and wings perfect, rarely abbreviate. Legs long, slender, very spinose. Tarsi compressed laterally, first joint longer than all the following ones together. Supra-anal lamina of male *emarginate* or *lobate*. Cerci pilose, distinctly acuminate, twice as long as the lamina."

Although adopting for the present the genus as defined above, it seems to me that its limits are drawn too far, and that the species possessing only lobiform elytra, that is, such not much exceeding the mesonotum and comparatively short cerci, might advantageously be united under another generic or subgeneric designation.

A. *Elytra abbreviated, wings rudimentary.*

PERIPLANETA ORIENTALIS, *Linné.*

Fauna Suec. n., 862 ; *Br.*, Syst., 226.

Blatta, L., 1745, &c. ; *Kakerlac*, Serv., Hist. Nat. Orth. ; *Stylopuyga*, Scdd.

"Brownish-ferruginous to chestnut Elytra of male not attaining the apex of abdomen, truncate ; of female slightly exceeding the mesonotum, lateral. Wings shorter than elytra in both sexes. Supra-anal lamina of male transverse, hindmargin membranous ; of female compressed, triangularly excised.

	Male.	Female.
Length of body ...	20--23 mm.	19 --23 mm.
Length of elytra ...	12--13·5 "	4·5-- 5 "
Length of pronotum	5-- 6·5 "	6 -- 6·5 "
Width of pronotum	7-- 7·5 "	8·5-- 9·5 "

Habitat.—All parts of the inhabited surface of the earth. In the collection of the S.A. Museum are specimens from Adelaide, Jamestown, Northern Territory, and Japan. The young larvæ are brownish-red, the older almost black ; hence the name of "Black Beetles."

PERIPLANATA RUFA, *spec. nov.*

Red, smooth, shining. Head pale-reddish, ocelliform spots yellow; base of antennæ and sides of face pale reddish-yellow; mandibles and palpi partly blackish. Antennæ as long as the body, dull ferruginous. Pronotum smooth, very shining, semi-circular, convex. Elytra abbreviated, attaining to the hind-margin of second abdominal segment, very broad, apex rounded, remainder oblique, concave ; veins distinct. Coxæ pale ; tarsi dilated beneath, forming very thin lamina. Abdomen with the segments angular, six and seven dull dark-brownish, hindmargins of all narrowly rugose, with many minute sulci ; lobes of segment eight prominent, triangular. Supra-anal lamina of male entire, rounded. Cerci about three times longer than lamina, acute,

beneath hirsute, Subgenital lamina of male entire, rounded, laterally fringed with fine hairs; styles very short, thick, black, inner side fringed, almost apical.

	Male.
Length of body	22 mm
Length of elytra	9 "
Length of pronotum	5 "
Width of pronotum	9 "

Habitat.—Oodnadatta, Central Australia. S.A. Museum.

An officer in the Government employ—Mr. F. Juncken, who has occasionally presented specimens—mentioned in one of his letters that cockroaches proved rather annoying. At my request for specimens, a single male was kindly and obligingly sent, which proved, as I had surmised, to be so different in details that I feel justified in assigning specific rank to it. The species is specially remarkable for the peculiar form of the genital parts, the shape of the elytra, and the lamina-like compressed tarsi, which are very long and closely pectinated beneath to the base of the claws.

PERIPLANETA CONCINNA, *Hagenbach.*

Bijdrag, 1842; *Br.*, Syst., 228.

"Brownish-chestnut; shining. Elytra shorter than abdomen in both sexes, acuminate.

	Male.	Female.
Length of body	12·5 mm.	14 mm.
Length of elytra	9 "	9 "
Length of pronotum ...	4·5 "	—
Width of pronotum ...	5·2 "	—

Habitat.—Australia, Java."

PERIPLANETA ROTUNDATA, *Brunner* (Syst., 230).

"Brownish-black, shining. Face spotted with testaceous. Elytra of female corneous, as long as pronotum is wide, rounded.

	Female.
Length of body...	24 mm.
Length of elytra	10 "
Length of pronotum	8·5 "
Width of pronotum	10 "

Habitat.—Fiji Islands."

B. Wings perfect; as long as, or longer than, abdomen.

a. Pronotum of two colours.

PERIPLANETA AMERICANA, *Linné.*

Syst. Nat., 687; *Br.*, Syst., fig. 24.

Ferruginous. Head black above—pale, with reddish blotches, below the antennæ; latter much longer than the body, pale

ferruginous. Pronotum subrotundate, yellowish testaceous, two large ferruginous spots in the disk with indistinct outline, hindmargin blackish-brown. Elytra of male much exceeding—of female as long as—abdomen. Legs and underside pale, also basal part of abdomen above. Supra-anal lamina of male broad, incised, lobes broad, rounded ; of female triangular, deeply and narrowly incised, lobes narrow, apex obtuse. Cerci more than twice as long as lamina, tapering from the base. Styles of male filiform, much exceeding the lamina.

	Male.	Female.
Length of body ...	28–32 mm.	28–31 mm.
Length of elytra ...	28–32 "	26–28 "
Length of pronotum	7·5–8 "	9–10 "
Width of pronotum...	9·5–11 "	11–12 "

Habitat.—Adelaide, South Australia (S. A. Museum), and all continents.

The above description has been drawn up from nine specimens belonging to both sexes, the measurements which are taken from Brunner's work, are considerably exceeded by some.

Periplaneta oculata, *Walker* (Brit. Mus. Cat. Suppl., 152).

" Piceous, fusiform, shining, whitish beneath. Head whitish, a black band between the eyes ; antennæ piceous, tawny towards the base. Pronotum whitish, long, laterally bordered with black very narrowly, a very large piceous patch extending to the straight hindmargin, near latter two round whitish spots. Legs pale yellow, thick, rather short. Wings blackish-brown, not longer than abdomen ; elytra coriaceous, corneous towards base, with a whitish costal stripe tapering from the base to three-fourths of the length. Abdomen beneath reddish, laterally whitish.

	Female.
Length of body	20 mm.
Length of elytra...	20 "

Habitat.—Australia."

Periplaneta Australasiæ, *Fabr.*

Syst. Ent., 271; *Br.*, Syst., 233.

" Brownish-ferruginous. Face brown, with a pale trigonal patch or small spot, Pronotum blackish, transversely elliptical, hindmargin nearly straight, intramarginal band sharply defined, humeral streak yellow. Elytra longer than the abdomen.

	Male.	Female.
Length of body	24 mm.	26 mm.
Length of elytra	27 "	24 "
Length of pronotum ...	7 "	8 "
With of pronotum... ...	9·5 "	11 "

Habitat.—Madeira, St. Thomas, Columbia *(Burm.);* Batavia *(Brunner);* Sumatra *(de Haan);* Cuba, Brazil, Mexico, Peru, Australia *(Walker*, Brit. Mus. Cat., 324)."

PERIPLANETA LIGATA, *Brunner* (Syst., 237).

" Brownish ferruginous, with the anterior and lateral margin bordered yellow. Legs testaceous, middle tibiæ bordered brownish, hind tibiæ wholly brown. Supra-anal lamina of male quadrate, triplicate; of female much produced, middle subcarinate, hindmargin deeply emarginate, angles acute. Subgenital lamina of male transverse, subemarginate; styles very long.

	Male and Female.
Length of body	25 mm.
Length of elytra...	22 "
Length of pronotum	7 "
Width of pronotum	10 "

Habitat.—Moreton Bay, Port Curtis, Queensland."

PERIPLANETA INCLUSA, *Walker* (Brit. Mus. Cat., 127).

" Blackish, fusiform, smooth, shining, yellow beneath. Head yellow, a piceous band across the face. Pronotum with two yellow bands connected on each side and forming an irregular fusiform ringlet, hinder band much broader and more irregular. Elytra and wings extending a little beyond the abdomen, former semicoriaceous, towards base corneous, blackish, with a yellow, subcostal, lanceolate streak from the base to one-third of length. Wings not paler.

	Male.	Female.
Length of body	22·5 mm.	24 mm.
Length of elytra	30 "	25 "

Habitat.—St. Domingo, West India; New Hebrides, Polynesia."

PERIPLANETA CURVIGERA, *Walker* (ibid, 134).

" (Section 6. Sides of pronotum and costa of elytra dilated, hyaline; hindmargin straighter than in section 1. Costa of elytra rounded. Two species.)

Pale-yellow, fusiform, smooth, shining. Head with a black band on the vertex; antennæ piceous, base testaceous, slender. Pronotum much dilated behind, with two black stripes in the disk. Legs short, stout. Wings extending beyond the abdomen; elytra coriaceous, a broad black stripe along the hindmargin extending nearly to the apex; hindwings membranous, pellucid, veins pale.

	Female.
Length of body	16 mm.
Length of elytra	18 "

Habitat.—Moreton Bay, Queensland."

This species belongs most probably to some other group (*Ichnoptera ?*).

Periplaneta biquadrata, *Walker* (ibid).

"Pale testaceous, fusiform, flat, shining, nearly smooth. Head with an irregular black band between the eyes; antennæ piceous, base testaceous, as long as the body. Pronotum mostly covered by a large scutcheon-shaped piceous patch, extending to hindmargin, near it including on each side, a large, subquadrate, testaceous spot; hindmargin scarcely rounded. Elytra piceous, membranous, with a pale testaceous costal stripe decreasing in width to apex. Wings piceous, a little larger than elytra, not paler.

Length of body (?)	20 mm.
Length of elytra	24 "

Habitat.—Australia."

b. Pronotum of the same colour as the body, concolorous.

Periplaneta pallipalpis, *Serv.*

Hist. nat. 71, n. 7 (*Kakerlac*); *Br.*, Syst., 238.

"Chestnut-coloured, shining. Mouth and palpi pale. Pronotum semi-circular. Elytra exceeding the abdomen, anal area very smooth, all longitudinal veins perspicuous towards the apex.

	Both sexes.
Length of body	21 mm.
Length of pronotum	6·5 "
Width of pronotum	9·5 "

Habitat.—Java, Sumatra (*Serville, de Haan*); Australia (*Brunner*)."

Periplaneta apicalis, *Walker* (Brit. Mus. Cat., 129).

"Testaceous, fusiform, shining, paler beneath. Pronotum with the sides slightly reflexed, curved near hindmargin, which is slightly rounded. Elytra slightly exceeding the wings, both the abdomen; humeral veins forked, longitudinal veins simple, transverse veinlets numerous. Wings pale cinereous, costa, apex and veins testaceous; *triangular area rather large* (?). Abdomen pale-yellowish, apex testaceous (Walker's Sect., 1).

	Female.
Length of body	18 mm.
Length of elytra	22 "

Habitat.—Australia."

This species belongs probably to the *Chorisoneuridæ.*

PERIPLANETA CONVEXA, *Walker* (ibid, Suppl., 152).

"Black, smooth, shining, convex, elliptical. Palpi piceous; antennæ setaceous, much longer than the body. Pronotum shortly conical. Elytra coriaceous, convex, extending a little beyond the body, costa and apex rounded; *covered portion of right one membranous, slightly paler.* Wings resembling membranous part of elytra, slightly longer. *Cerci broad, short.* Female (size not given).

Habitat.—Moreton Bay, Queensland."

The italicized parts of the description indicate that the species scarcely belongs to this genus.

Of the following species the descriptions have not been available. Walker places the first two with *P. Americana* in his Sect. 1; they will therefore be long-winged forms; the third is possibly synonymous with *Pseudophyllodromia Heydeniana*, Sauss., in fasc. 2 Mem. Soc. Phys. de Genéve, 1870.

PERIPLANETA MARGINALIS, *Saussure.*

Rev. Zool., 1864, No. 30; Mel. Orth., 31.

Habitat.—Queensland, Western Australia (*Walker*).

PERIPLANETA SORAR, *Saussure* (ibid, no. 35).

Habitat.—Australia.

PERIPLANETA HEYDENIANA, *Sauss.* (Rev. Zool., 1864, Nov. 29).

Habitat.—West Australia.

c. *Elytra lobiform or absent. Body mostly black, concolorous. Cerci not twice as long as lamina. Valvules normal.* Subgenus SYNTOMAPTERA, *mihi,*

PERIPLANETA FORTIPES, *Walker* (Brit. Mus. Cat., 137).

"Black, fusiform, shining, very thickly and minutely punctured. Head smooth, sockets of antennæ, labium and palpi piceous; antennæ dark-red, basal part black, as long as the body. Pronotum with a very shallow lateral furrow, hindmargin straight. Elytra absent. Legs stout, reddish-black, tarsi red towards the apex. Abdominal segments six and seven with angles produced, acute. Supra-anal lamina truncate. Cerci long, lanceolate.

Length of body (both sexes) ... 22–27 mm.

Habitat.—West Australia, Tasmania, New Zealand."

Periplaneta invisa, *Walker* (ibid, 137).

"Resembling *P. fortipes*. Head with reddish labrum. Supra-anal lamina emarginate. Coxæ bordered with yellow.

Length of body (both sexes)... ... 27–32 mm.

Habitat.—Australia (N.S.W. ?); West Australia."

Periplaneta glabra, *Walker* (ibid, 139).

"Deep black, oval, convex, smooth, shining. Antennæ black. Pronotum rounded laterally, hindmargin straight. Metanotum with angles slightly produced. Elytra triangular, corneous, rudimentary. Legs short. Abdominal segments with the angles successively more elongated, acute. Supra-anal lamina bilobed, lobes tetragonal. Cerci fusiform, flat Styles long, slender.

Length of body (male) ... ... 18 mm.

Habitat.—Australia."

There are three female specimens in the collection of the S.A. Museum, which I refer to this species, and from which the following description is drawn up :—

Deep black, narrowly fusiform, very convex and shining, hindmargins of segments narrowly lurid. Head and antennæ black; ocelliform spots, margins of clypeus and labrum, also palpi, very pale. Thoracic segments laterally narrowly reflexed; disk polished, with distant impressed dots, hindmargin of metanotum convex. Elytra absent. Underside and legs dark piceous, tarsi and spines brown; claws pale. Abdominal segments angular, posterior ones produced, acute, hindmargin scabrous, minutely dotted. Supra-anal lamina tapering, deeply emarginate, angles rounded. Cerci nearly twice as long as lamina, lanceolate, thick, acute, black.

	Female.
Length of body	15 mm.
Length of pronotum	4·5 "
Width of pronotum	6 "
Width of abdomen	8 "

Habitat.—Northern Territory of South Australia. S.A. Museum, presented by the Hon. Dr. S. J. Magarey.

Periplaneta obscura, *sp. nov.*

Resembling the preceding; dull black-brown to black. Head, antennæ, and mouth parts reddish. Pronotum smooth, with a few impressed dots. Meso- and meta-notum, also abdomen, thickly and minutely tuberculate. Elytra lobiform, not exceeding the mesonotum. Legs short, stout, hind tibiæ short, entirely deep reddish-brown. Supra-anal lamina compressed, emarginate. Cerci broad, lanceolate, acute.

	Female.
Length of body	14 –15 mm.
Length of pronotum	3·5–4 "
Width of pronotum	6 "

Habitat.—Northern Territory of South Australia. S.A. Museum, presented by the Hon. Dr. S. J. Magarey.

PERIPLANETA SCABRIUSCULA, *spec. nov.*

Resembling *P. glabra.* Deep piceous to black, shining. Head black; antennæ, labrum, and palpi reddish. Pronotum smooth. Meso- and meta-notum slightly scabrous, with minute acute tubercles. Elytra lobiform in both sexes. Legs red, concolorous; tibiæ long; tarsi pale beneath. Supra-anal lamina of male subangular, deeply grooved in the middle; hindmargin concave, of female much compressed, emarginate. Cerci rather long, deep black, acute, extreme tip red. Subgenital lamina of male quadrilateral, angular, hindmargin concave; styles long, slender, black, apex red.

	Male.	Female.
Length of body ...	12–14 mm.	16 –18 mm.
Length of pronotum...	4– 4·5 "	5 – 6 "
Width of prototum ...	7– 7·5 "	7·5– 8·5 "

Habitat.—Belair (Mount Lofty Range), Port Vincent (Y.P.), Kangaroo Island (larvæ only): South Australia. S.A. Museum.

Some thirteen specimens were compared from the above localities. They were taken in June, living by day under loose bark of Eucalyptus-trees near the ground.

PERIPLANETA PROVISIONALIS, *spec. nov.*

Resembling the last. Brownish-red, scabrous, shining. Lobes of elytra very narrow. Abdomen brown below. Supra-anal lamina short, deeply and roundly emarginate. Cerci rather short. Valvules black.

	Female.
Length of body	12 mm.
Length of pronotum	4 "
Width of pronotum	6 "

Habitat.—Mount Bryan East. S.A. Museum, presented by Mr. T. Best.

DEROPELTIS, *Burm.*

Handb. II., 486; *Br.*, System, 240; *Blatta*, Serv.

"Male winged, female wingless. Head partly free above; antennæ thick, longer than the body. Elytra and wings of male doubly exceeding the abdomen, narrowed in the middle, apex acuminate. Femora very slender, spines very short, first joint of tarsi exceeding the following joints. Abdomen of male oblong;

of female broad and round, dorsal segments truncate, scarcely exceeding the ventral, fifth incised in the middle. Supra-anal lamina of male transverse, with an impressed medial line, margin entire; of female triangular, laterally deflexed. Cerci of male longer than lamina, articulate; of female short, inarticulate. Subgenital lamina of male rounded, large, exceeding the supra-anal; styles long.

The genus, as defined by Brunner, is chiefly of South African habitat, one species only being recorded doubtfully from Java. In the British Museum Catalogue, Walker records, p. 231, "*Epilampra irrorata*, Thunb., nov. spec. I., 76; Fabricius, Ent. Syst. II., 8," from Australia in three instances. Referring to Brunner's record of the literature quoted. "*E. irrorata*" is not mentioned at all, but the pages cited quote *Blatta erythrocephala*, Fabr. (Ent. Syst., II., p. 7 and 8), while *B. capensis*, Thunb. (Dissert. Ent., 77) is mentioned as a synonym of the former. Whence Walker obtained the name "*irrorata*" is not apparent, but most likely another synonym for *B. erythrocephalus*, Fabr. As I am not in a position to prove his localities wrong, I insert the genus on his authority.

Deropeltis erythrocephalus, *Fabr.*

Blatta, Fabr.; *Br.*, Syst., 242, fig. 38.

"Brownish-black, dull. Head red; antennæ rather thick, black, apex reddish. Legs ferruginous. Pronotum of male transverse, oval, rounded. Disk triangularly impressed. Elytra longer than wings, brownish-chestnut. Femora with sharp scattered spines. Female black, dull. Abdomen with fifth segment sinuate laterally.

	Male.	Female.
Length of body... ...	27 mm.	28 mm.
Length of elytra ...	33 "	—
Length of pronotum ...	5·2 "	7 "
Width of pronotum ...	8 "	12·5 "

Habitat.—Cape of Good Hope (authors); Australia (*Walker*)."

d. Elytra lobiform or absent. Valvules of female not, or scarcely free.

Drymaplaneta, *gen. nov.*

Etymology:—*Dryma*, wood; *planeta*, runners.

Body like *Periplaneta*, smooth, shining, margins pale. Antennæ setaceous, as long or longer than the body, ciliate. Elytra *lobiform, short, or absent;* wings none. Legs rather short; femora and tibiæ more or less densely spinose; tarsi with *first joint shorter, or scarcely longer than the following two together.* Supra-anal lamina of male moderately broad, more or less con-

cave; angles rounded; of female conical or triangular, compressed or flat, more or less deeply incised, angles acute. Cerci lanceolate, flat, acute, from one-half to twice the length of the lamina. Subgenital lamina of male with slender, acute *styles, inserted at the apex of the keels*, mostly produced. *Valvules* of female *conjoined*, not or scarcely free, the suture indicated by a furrow or keel separated by furrows from the adjoining membrane.

The genus differs from *Platyzosteria* by the longer cerci of both sexes, and the styles of the males; from *Periplaneta* by the lobiform elytra, pale margins, &c., and from all by the conjoined valvules of the female. The species frequent woods, never human habitations, unless carried there by accident. Their habits appear to be more or less nocturnal, leaving their hiding-places soon after sunset, or on cloudy days in the late afternoon, when they run about actively on the surface or ascend shrubs and trees in quest of their prey, viz., living insects of all kinds; and have therefore a claim, so far as ascertained, to rank as highly beneficial generally. Most of them are readily distinguished by the pale margins of the thorax or all round the body.

DRYMAPLANETA COMMUNIS, *spec. nov.*

Elongate oval, black (or lurid when young), smooth, shining. Head and antennæ reddish, space at base of latter and mouth-parts pale-yellowish. Pronotum mostly with a faint dark-red median line, and a pale-yellow, cuneiform lateral stripe on each side, narrow in front, broad behind, bordered outside narrowly with black, and continued along the meso- and meta-notum, occasionally extending to the basal part of the adjoining abdominal segment, and sometimes reappearing in the form of round dots on one or more of the following ones. Elytra rather broad, inner part and apex black, not much exceeding the mesonotum. Underside of body piceous, varied with red. Coxæ broadly white-bordered; femora and tibiæ paler or darker red; tarsi pale-reddish. Abdominal segments angular, angles much produced, acute. Supra-anal lamina of male subangular, narrowed behind, angularly and broadly emarginate, ciliate; of female narrow, triangular, deeply emarginate, apex of lobes rounded. Cerci long. Subgenital lamina of male, like supra-anal, transverse, emarginate, angles rounded; styles long. Subgenital plate of female subvalvular.

	Male.	Female.
Length of body ...	21--25 mm.	18--20 mm.
Length of elytra ...	4 "	3 "
Length of pronotum	6-- 7 "	5-- 6 "
Width of pronotum	9--10 "	7-- 8 "

Habitat.—Mount Lofty Range, Adelaide, Nairne, Nuriootpa, Ardrossan (Yorke's Peninsula): South Australia. S.A. Museum.

Some ten specimens were examined, varying very slightly, as indicated above. The species differs from *Platyzosteria albomarginata*, Br., only in the form of the supra-anal lamina, greater length of cerci, and brighter colour of the legs; and the latter might probably be included in this genus with advantage. *D. communis*, as implied by the name, is one of the commonest species in the southern part of the province, occurring in the adult stage from June till January, and perhaps more seldom all the year round, but is very shy and active. Its odour is very disagreeable.

Drymaplaneta submarginata, *spec. nov.*

Dark piceous to chestnut, with the pale-yellowish margin nearly all round. Head of male, with trilobed vertex, and a patch like an hourglass in front reddish-brown, remainder pale-yellowish or whitish; of female concolorous, reddish; palpi whitish, second and third joints equally long, very thick; fourth joint shorter, pale-yellowish; antennæ ferruginous. Pronotum shining, pale margin contiguous in front, or more or less interrupted, a narrow dark-red medial line or broader lurid stripe (sometimes obsolete). Elytra short. Metanotum with the hindangles considerably produced, rounded. Underside dark chestnut. Legs with the coxæ pale-yellowish, with a blackish stripe; femora and tarsi rather darker; tibiæ reddish to brownish. Abdomen slightly dilated, hindangles of segments much produced, acute, lateral pale stripe interrupted by narrow black and brown hindmargin, reduced to short narrow streaks in segments six and seven. Supra-anal lamina of male quadrilateral, black, hindmargin retuse, slightly ciliate, angles obtuse; of female the hindmargin of segment seven bordered yellowish, lamina narrow, subtriangular, slightly compressed, deeply and triangularly emarginate, sides narrowly yellowish, lobes subacute. Cerci of male nearly twice as long as lamina, brown, concolorous; of female piceous, apex yellowish. Subgenital lamina of male transverse, truncate; styles slender, acute, red, nearly as long as the cerci.

	Male (adults).	Female (larvæ).
Length of body ...	21--23·5 mm.	21 mm.
Length of pronotum	7 "	5 "
Width of pronotum	9--10 "	7 "

Habitat.—South-western part of Kangaroo Island, Blakiston, Mount Lofty Range: South Australia. S.A. Museum.

There is some doubt as to the correct mating of the sexes. A very young larva from the Northern Territory and two others

from the South-East of our province resemble the above females, but may belong to another species.

Drymaplaneta obscuripes, *spec. nov.*

Piceous to black; a broad deep-yellow margin all round, bordered exteriorly very narrowly with black or brown, inner border line jagged; smooth, shining. Head, palpi, and basal joints of antennæ black, a band between the eyes, and the mouth-parts reddish. Pronotum irregularly wrinkled; hindangles of thoracic segments slightly produced, broad, rounded. Elytra wholly obsolete. Underside dark. Coxæ and femora blackish, former bordered with white, tibiæ and tarsi dark reddish-brown. Abdomen more or less lurid to dark red in the disk, bordered with black; angles keeled, produced as distinct spinelets; hindmargin of seventh segment yellow; beneath dark reddish, with a broad black margin. Supra-anal lamina of both sexes subtrigonal, deeply and acutely emarginate, lobes of male acute, of female obtuse, black, with two yellow spots. Cerci not twice as long as lamina, apex (male obtuse, female acute) pale. Subgenital lamina of male transverse, truncate; styles short, acute. Valvular plate of female with a broad furrow.

	Male.	Female.	Larva.
Length of body ...	23 mm.	25 mm.	20 mm.
Length of pronotum ...	5 "	5 "	4·5 "
Width of pronotum ...	9 "	9·5 "	8 "

Habitat.—West Coast of South Australia; Fraser Range, West Australia. S. A. Museum.

Only a larva, differing in some details, was collected at the latter place by Mr. R. Helms (Elder Expl. Exped.) on October 12, 1891, the other specimens (one male, two females) were probably collected by Prof. R. Tate at about the head of Great Bight.

Drymaplaneta subbifasciata, *sp. nov.*

Piceous, sometimes clouded with deep red, lateral margins broad, yellow, bordered with black, produced transversely along the hindmargins of the pronotum and metanotum, forming bands interrupted in the middle. Body smooth, with very numerous, minute, impressed dots. Vertex and face black, a broad curved band between the antennæ, sides, &c., pale yellow; antennæ pale reddish, palpi very pale. Pronotum and mesonotum with a broad subconical impression, medially and various wrinkles behind. Elytra obsolete. Underside piceous. Coxæ pale-yellowish, a black stripe anteriorly; femora dark-red, with two blackish stripes; tibiæ brown; tarsi paler. Abdomen with hindangles more or less produced, acute; hindmargin of segment

seven narrowly ferruginous, disk pubescent. Supra-anal lamina of female slightly compressed, emarginate, ciliate, lobes rounded. Cerci very long. Subgenital plate with a deep, broad, medial furrow, not free.

	Adult.	Larvæ.
Length of body (female) ...	22 mm.	17–21 mm.
Length of pronotum ...	6 "	5– 5·5 "
Width of pronotum ...	11 "	9– 9·5 "

Habitat.—Northern Territory of South Australia. S.A. Museum.

Of this conspicuously-coloured species one adult and three larval females were presented by the Hon. Dr. S. J. Magarey in 1886.

Drymaplaneta semicincta, *Walker.*

Periplaneta, Brit. Mus. Cat., 140.

" Black, fusiform, smooth, shining, piceous beneath. Vertex, labrum and palpi yellow ; antennæ dark-red. A lateral yellow stripe extending from the foremargin of pronotum to second or third abdominal segment. Pronotum elongate, widening behind, hindmargin straight. Elytra lobiform, luteous, hindmargin black. Legs short, tarsi red towards the tips, or wholly black. Abdomen with angles produced, acute. Supra-anal lamina truncate, angles acute. Cerci long, lanceolate.

Length of body (both sexes) ... 18–20 mm.

Habitat.—Navigator's Isle ; Formosa.

Drymaplaneta sexguttata, *Walker.*

Peripl., ibid, 141.

" Black, elliptical, convex, smooth, shining. Sockets of antennæ and labrum piceous ; antennæ with a tawny, antemedial, very broad band. Thoracic segments each with a white spot near each hindangle. Pronotum subsemicircular, laterally very minutely punctured. Meso- and meta-notum with the angles slightly elongated. Elytra none. Legs short, thick, coxæ bordered white. Abdominal segments tuberculate, successively more produced, acute ; beneath a broad, indeterminate stripe. Supra-anal lamina entire. Styles long.

Length of body (male) ... ... 13 mm.

Habitat.—Australia (perhaps a young larva)."

Drymaplaneta semivitta, *Walker.*

Peripl., ibid, 143.

" Black, fusiform, smooth, shining. Head with a yellow ban in front ; labrum yellow ; palpi pale yellow. Thoracic segment laterally with a yellow stripe bordered black laterally, inner side

undulating; underside mostly pale-yellow, sides rounded, hind-margin straight. Elytra lobiform. Legs thick, pale yellowish piceous. Supra-anal lamina bidentate.

Length of body (female)... ... ... 23 mm.

Habitat.—West Australia."

"In vol. II. of Capt. Ph. P. King's Survey of the Coasts of Australia, 1818-1822, page 454, a species is described as *Blatta australis*, McLeay, which may belong to this genus, but the description is wholly inadequate to fix family or genus, and the species will have to remain undeterminate."

II. Femora spineless or rarely the fore femora with a few spines.

A. Claws with arolia (except females of Heterogamidæ).

CHORISONEURIDÆ (*Br.*, Syst., 251).

"Head large, free, convex; eyes remote. Pronotum rounded or quadrate. Elytra quite explicate, acuminate; veins distinct, radial vein branching pinnately. Wings either with their anterior part acuminate, or the apical area folding and reflexed; anal area with radiating veins, fanlike. Femora spined at apex only. Abdominal segment with the angles straight or rounded, never produced. Supra-anal lamina of male rounded; of female similar or emarginate. Subgenital lamina of male rounded; styles provided."

There are several genera, mostly extra-Australian, with only a few species in each. They are mostly of very moderate size, and distinguished by the pinnately-branched radial vein of the elytra, and the very large triangular area of the wings, or in one genus, by the wings foldings traversely in the middle. Only two genera appear to occur in Australia.

CHORISONEURA, *Brunner* (System, 255, fig. 26).

"Elytra with the radial and ulnar veins separated. Wings perfect, apical area membranous. Femora unarmed, pilose. Supra-anal area of male scarcely produced; of female much produced, emarginate. Last ventral segment of female much contracted in the middle. Cerci long, slender, filiform in both sexes.

The five species described by Brunner are from Brazil (4), and Mexico (1). The Australian species may possibly justify a new genus for their reception, but the material available is too scanty for a complete diagnosis.

CHORISONEURA HYGROPHOROIDES, *Walker*.

Blatta, Brit. Mus. Cat., 96.

"Black, fusiform, depressed, ferruginous beneath. Head tawny in front, labrum and vertex testaceous. Pronotum

minutely punctured, laterally and posteriorly testaceous, laterally much dilated, hindmargin rounded. Legs short, ferruginous. Elytra smooth, coriaceous, costa rounded, testaceous towards the base, costal area broad. Wings cinereous, hyaline.

	Male.
Length of body	5 mm.
Length of elytra	5 "

Habitat.—Australia.

The above abridged description of Walker fits very well (as far as it goes) for the insects I refer to this species, but another supplementary description drawn up from the specimens examined may serve to define it better. The meso- and meta-notum of the male nymph, and the elytra of the adult female are reddish-brown, antennæ ferruginous, hirsute, as long as the body. Abdomen dark-brown in the disk; last dorsal segment, supra-anal lamina and cerci of female brownish testaceous, last ventral segment very much produced, subtrigonal, apex obtuse.

	Male.	Female.	Larvæ.
Length of body	6 mm.	7 mm.	4·5 mm.
Length of elytra	—	5·5 "	—
Length of pronotum ...	1·7 "	1·3 "	1·2 "
Width of pronotum ...	3 "	2·5 "	2 "

Habitat.—Mount Pleasant, Kangaroo Island, a doubtful larva from Mount Bryan East; South Australia. S.A. Museum.

Chorisoneura Loftyensis, *spec. nov.*

Brownish-ferruginous. Head, antennæ, pectus and legs yellowish. Pronotum very broad, much rounded laterally, two blackish transverse bars in the disk before the middle. Elytra of male as long as abdomen, of female shorter; veins raised. Abdomen laterally and medially blackish, with two broad submarginal brownish ferruginous stripes; apex and cerci brownish-ferruginous.

	Male.	Female.	Larvæ.
Length of body	7 mm.	8 mm.	5–7 mm.
Length of elytra	5 "	5 "	—
Length of pronotum ...	1·6 "	1·7 "	1·3 "
Width of pronotum ...	3·3 "	3·6 "	2·7 "

Habitat.—Mount Lofty Ranges, South Australia. S.A. Museum.

The insects are very nimble, and inhabit the narrow spaces under bark and the cracks and fissures of dead timber during the early and hottest months of the year.

CHORISONEURA PECTINATA, *Saussure.*

Mel. Orth., in Mem. Soc. Phys., Genéve.

Habitat.—Australia.

ELEUTHERODA, *Brunner* (Syst., 264, fig. 29).

"Silky pilose. Head large. Pronotum semiorbicular in front, truncate behind. Elytra flat, almost rectangular, scarcely slanting, not exceeding the abdomen. Wings twice as long as the elytra, wholly folded back in the middle. Legs slender. Abdomen oblong, convex beneath. Supra-anal lamina of male transverse; of female rounded. Cerci small, base very broad, four-jointed. Subgenital lamina of male small; styles short.

The insects resemble Coleoptera considerably in appearance, and much more so than any other of the Blattariæ, except *Cassidiodes*, from the Philippine Islands, but of different type; the former apparently mimicking certain Tenebrionidæ, the latter resembling our black Paropsinæ.

ELEUTHERODA GALERUCOIDES, *Walker.*

Diploptera, Brit. Mus. Cat., 57.

"Tawny, flat, elliptical, shining, very finely punctured, minutely setulose. Head largely but distantly punctured. Antennæ submoniliform, shorter than body, base black. Pronotum transversely subelliptical, sides much rounded, semi-hyaline, hindmargin straight, disk with two interrupted, much abbreviated, blackish bands. Elytra coriaceous. Wings cinereous, hyaline. Legs moderately long. Abdomen piceous, slightly longer than elytra. Supra-anal lamina deeply concave above, or margin much deflexed, tawny. Cerci long, tawny.

Length of body (female) ... ... 6 mm.

Habitat.—Tasmania."

PANCHLORIDÆ (*Br.*, Syst., 266).

Head rather thick, partly or wholly covered by pronotum. Pronotum mostly smooth, angular or truncate behind, flat or hooded. Elytra perfectly explicate (except *Oniscosoma*), rounded, without apical area, anal vein impressed, axillary veins very close. Wings rounded in front, apical area not distinct, fan-like explicate, anal area fan-like, ulnar vein pectinate. Femora unarmed; tarsi with arolia. Abdomen depressed, angles of dorsal segments acute. Supra-anal lamina of both sexes quadrate, incised, or entire. Both sexes winged, except in *Oniscosoma.*

Most species of the six small or moderately-sized genera of this family are extra-Australian, and widely distributed. The chief distinctions are the quadrate, incised or entire lamina of the

female, the produced angles of the hindmargins of segments, and the possession of wings by both sexes, excepting in one genus.

Whether Walker's species is rightly placed I cannot say, not having seen any specimens.

NAUPHOETA, *Burmeister.*

Handb. II., 508 ; *Br.*, Syst., 283, fig. 38.

"Antennæ setaceous, slightly shorter than the body. Pronotum truncate in front and behind, laterally much deflexed, hindangles obtuse. Abdomen scarcely dilated, nine dorsal segments. Supra-anal lamina of male quadrate, angles obtuse, middle impressed ; of female transverse, angles rounded, emarginate, and plicate in the middle. Cerci not exceeding the supra-anal lamina, smooth."

All the few other species, besides the following, occur in Africa and America.

NAUPHOETA DISCOIDALIS, *Walker* (Brit. Mus. Cat., 39).

"Black, elongate fusiform, flat, shining, thinly punctured. Head with pale-yellow ocelliform spots, a transverse impression near them, and a yellow band near the mouth. First joint of palpi testaceous. Antennæ very slightly setulose, sockets pale yellow. Pronotum yellow, sides rounded, margin and a discoidal spot black, latter slightly concave in front, with two notches behind approaching close to hindmargin. Meso- and meta-notum with hindmargins yellow. Elytra unsymmetrical in colour, left elytron piceous, with three unequal yellow spots, apex grey, hyaline, veins hyaline, costa and costal veins yellow, rounded towards the base ; right elytron pale-grey, hyaline, except the yellow marks and an intermediate piceous patch. Wings pale-grey, hyaline, costal streak and veins brownish. Legs tawny, stout. Abdomen piceous, with lateral triangular, testaceous spots, beneath tawny at the base. Supra-anal lamina testaceous, slightly notched.

	Both sexes.
Length of body	18 mm.
Length of elytra	12–18 "

Habitat.—New Guinea ; Waigou."

Stated to resemble *N. amoena*, Saussure, but to differ in the markings.

ZETOBORA, *Burmeister.*

Handb. II., 509 ; *Br.*, Syst., 288, fig. 39.

" Head depressed, covered by pronotum. Pronotum rhombic, rounded in front, subtruncate behind, lateral angles acute, fore-margin reflexed, disk cucullate, impressed punctate or granulate. Scutellum free. Elytra with very broad base, attenuated towards

the apex. Wings with median vein undivided. Abdomen with hindangles of dorsal segments much produced. Supra-anal lamina of female quadrate."

The nine species recorded by Brunner are all South American, also all those under section 1, 7 and 8, by Saussure and Walker. It is therefore quite probable that all those from Asia, Africa, and Australia, cited by the two last authors, do not belong to this genus, especially as "*Z. granicollis*," Sauss. (Section 6), has been suggested as synonymous with *Oniscosoma castanea*, Brunner, but this can only be decided by studying the types.

ZETOBORA ANTICA, *Walker* (Brit. Mus. Cat., 47).

"Blackish, elongate fusiform; testaceous beneath. Head black, shining, transversely impressed between the antennæ testaceous towards the mouth, also the palpi. Antennæ half the length of body. Pronotum with reflexed margins, minutely and darkly tuberculate, testaceous, semihyaline, angular, space behind not excavated, hindmargin hardly rounded, outline of blackish part angular, laterally notched. Elytra ferruginous, concolorous. Wings grey, lurid towards the costa. Legs tawny. Sub-anal (?!) lamina entire. Cerci piceous or tawny.

Length of body (both sexes)	...		...	18–20 mm.
Length of elytra	...	...	...	24–26 "

Habitat.—Australia.

ONISCOSOMA, *Brunner* (Syst., 298).

Zetobora, Saussure; *Laxta*, Walker (young form).

Males winged, females wingless. Pronotum lenticular, exceeding the head very much, lateral angles of male rounded, of female acute, hindmargin of male rounded, of female subtruncate; in the middle (above the head) more or less cucullate. Elytra of male very much longer than the abdomen, wings as long as elytra, very broad anteriorly. Meso- and meta-notum of female with the hindangles very much produced. Legs short, rather thick. Abdomen of male ovate or suborbicular; of female ovate, dorsal marginal appendages much exceeding the ventral. Supra-anal lamina of male transverse, obtuse; of female quadrate, angles obtuse, subduplicate in the middle or emarginate. Cerci of male about three times as long as the lamina, with ten to twelve joints; of female dilated, shorter than the lamina. Subgenital lamina of male much produced, rounded; styles reflected.

The genus contains only two species, and is limited to Australia. It represents here the *Heterogamidæ*, which it resembles in aspect and habits; the latter being very abundant in Africa,

and extending to the Mediterranean coast, but almost absent from Australia. The descriptions are drawn up from numerous specimens.

ONISCOSOMA CASTANEA, *Brunner* (Syst., 300, fig. 36).

Diploptera silpha, Sauss., Rev. Zool., XVI., 325; *Zetobora granicollis*, Saussure, Melb. Orth., 33, fig. 21, 1862; *Laxta oniscoides*, Walker, Brit. Mus. Cat., 18.

Male.—Dull chestnut or coffee-brown. Head of male blackish-brown or black, shining; antennæ brown; labrum, palpi, and space at base of antennæ yellowish, also the legs and most of the underside. Pronotum of male rounded in front, widest in the middle and angular; foremargin broadly dull-yellowish, with a few dark granulations; sides gradually narrowed to the hind-angles; disk blackish in the middle, sides chestnut, densely granular, with two converging furrows in front, enclosed space raised over the head; quadrilateral area beyond widest behind at the hindmargin. Elytra large, rounded at the apex, veins much raised, irregularly reticulate radial vein black near the base. Wings slightly shorter, border deeply emarginate in the middle, smoky tinted. Scutellum triangular. Abdomen elongated, brownish testaceous, lateral margin narrow, angles obtuse, slightly produced. Supra-anal lamina short, transverse, rounded. Cerci much longer, slender, subterete, acute, hairy. Subgenital lamina subquadrate, shining, exceeding the supra-anal, *unsymmetrical*, the right side deeply emarginate, bordered pale, the left side not; hindmargin rounded, much reflexed; styles very slender, setaceous.

Female.—Broadly oval, outline regular, almost contiguous all round, reddish-chestnut, with numerous, much darker granulations, margins and indistinct longitudinal stripes pale; stigmatic spots, large, black. Head same as male. Pronotum nearly semicircular, hindmargin nearly straight, in the middle slightly and angularly produced, lateral angles obtuse. Lateral margin all round laminar, very broad, hindangles broadly and triangularly produced, very acute behind. Supra-anal lamina flat, very large, keeled, hindmargin rounded, entire. Cerci broad, acuminate, inserted in a narrow space between the produced hind-angles of preceding segment and the lamina, not exceeding either. Last ventral segment shorter, very broad, subtrigonal, sides sinuate, apex broadly rounded.

	Male.	Female.	Larvæ.
Length of body ...	22 mm.	24 --26 mm.	8--18 mm.
Length of elytra...	22–24 "	—	—
Length of pronotum	5– 6·3 "	6 – 7·3 "	2– 5 "
Width of pronotum	9–10 "	11·5–12·5 "	4–10 "

Habitat.—Vicinity of Adelaide, Murray Scrub, Sedan, Kangaroo Island; South Australia. Northern Territory of South Australia. S.A. Museum. Eastern Australia *(Brunner)*.

The adults are remarkably uniform in coloration, but the larvæ are very different. They are more or less conspicuously marked by paler and darker longitudinal interrupted stripes, varying according to age or size, and gradually disappear when attaining the adult stage. Walker's description of his *Laxta oniscoides* agrees perfectly with that of a half-grown larva. The insects are numerous in woodlands, hiding under bark, logs, &c., and fly about at night, but do not live in houses. The larvæ appear chiefly in January and February, the adults from May to October, but the latter may be found occasionally all the year round.

ONISCOSOMA PALLIDA, *Brunner* (Syst., 301).

"Testaceous. Pronotum of male brown in the disk, minute brown granules scattered over the major part of the wings. Elytra ample, acuminute, translucent. Female wholly testaceous above, granules black, very much raised, scattered. Abdominal segments appendiculate. Supra-anal lamina emarginate in the middle.

	Male.	Female.
Length of body... ...	21 mm.	23 mm.
Length of elytra ...	26 "	—
Length of pronotum ...	6·2 "	8·2 "
Width of pronotum ...	9·5 "	15 "

Habitat.—New South Wales."

The species differs in the pale colour of both sexes, the ulnar vein emitting bifurcate branches, &c.

PERISPHAERIDÆ, *Brunner* (Syst., 302).

"Head covered. Pronotum of male tranversely lenticular; of female orbicular. Elytra of male perfect; of female absent, rudimentary, or perfect, corneous. Wings, when present, fan-like. Femora spineless; tarsi with arolia. Dorsal abdominal segments truncate behind, angles not produced, not exceeding ventral segments. Supra-anal lamina subquadrate, angles rounded; of female corneous, rounded, entire, not plicate. Cerci of male depressed, longer than lamina; of female short, triangular. Subgenital lamina of male large, with or without styles.

The principal distinctions from the preceding family are that the supra-anal lamina of the female is rounded, and the hind-angles of the abdominal segments are not produced. It is best represented in South Africa, but some species occur also in India, and others in South America.

PERISPHAERIA, *Serville.*

Burm., Handb. II., 483 ; *Br.*, Syst., 303, fig. 37.

"Males winged, females wingless. Head covered. Pronotum of male lenticular, foremargin semicircular, slightly raised over the head, flat, not gibbous, hindmargin rounded ; of female semi-orbicular, truncate behind, not incrassated, or dentate beneath. Elytra of male linear, costal area broad. Wings entire, median vein straight, or decurved at apex. Legs thick. Abdomen ovate, dorsal segments truncate behind, angles obtuse. Supra-anal lamina of male transverse ; of female rounded. Cerci of male lanceolate, long, depressed; of female small, conical, inarticulate.

All the typical species (eight) described by Brunner belong to South Africa ; those by Walker are Australian.

PERISPHAERIA LAMINATA, *Walker* (Brit. Mus. Cat., 178).

"Black, elliptical, convex, dull, thickly tuberculate above, smooth and shining beneath. Head transversely impressed ; base of antennæ, labrum and palpi testaceous ; antennæ less than half the length of body. Pronotum semicircular, covering the head, testaceous and sub-hyaline in front (paler beneath), sides flat, hindmargin scarcely rounded in the middle. Meso- and meta-notum much dilated, hindangles elongate, acute. Legs and whole underside tawny. Abdomen with dorsal segments extending beyond the ventral, hindangles slightly elongate, acute. Supra-anal lamina entire. Cerci very short.

Length of body (female)... ... ... 22 mm.

Habitat.—South Australia ; West Australia."

No specimen answering to the description has yet been seen. It cannot well be assumed that Walker overlooked the spineless femora, when placing the species here, else one might doubt the position.

PERISPHAERIA FALLAX, *Walker* (ibid, 172).

"Black, fusiform, shining, very convex, roughly punctured Head smooth, extending a little beyond the pronotum, vertex and palpi dark-red. Antennæ longer than half the body, setose, dark-red towards the base. Pronotum parabolic, or short conical, sides rounded, straight behind. Meso- and meta-notum with hindangles hardly elongate. Legs deep-red, short, thick, tibiæ with short spines. Cerci very short.

Length of body (female) ... ... 10 mm. (?)

Habitat.—West Australia."

DEROCALYMMA, *Burmeister.*

Handb. II., 487 ; *Br.*, Syst., 315, fig. 41.

"Males winged, females wingless. Head wholly covered.

Antennæ extremely slender, half the length of the body. Pronotum with margin acute, incrassated beneath, except over the head. Styles of male absent. Chiefly South African and Indian species.

Derocalymma contigua, *Saussure.*

Mem. Soc. Phys. de Genéve, 1873.
Habitat.—New Guinea.

Ectatoderus, *Saussure.*

Ann. Soc. Ent., France (6), II., 463.

Ectatoderus Noumeensis, *Saussure* (ibid).

Habitat.—New Caledonia.
This genus and species are quoted from the Zoological Record, vol. XIX., 1883.

Heterogamidæ (*Br.*, Syst., 350).

"Head globose, male with ocelli, female with ocelliform spots. Pronotum transverse, pilose, or ciliate. Elytra of male perfectly explicate, anal vein angulose, impressed; female wingless or perfectly winged; anal area not folding fan-like, wholly reflexed. Femora unarmed (or the first pair only with a few spinelets), tarsi very long, those of male with arolia, of female without such. Abdominal segments constricted or straight. Supra-anal lamina incised, or plicate and entire. Subgenital lamina of male with styles.

Only two genera of this family are recorded by Brunner. The typical one, with five species, occurs in Africa and the Mediterranean regions, and the other, *Homœogamia*, exclusively in Mexico, and is monotypic. No representatives were hitherto known from Australia. The remarkable species from the western coast of South Australia is so divergent in some characters, that it not only requires a new genus for its reception, but might become the type of a new family when sufficient material becomes available.

The following synopsis will indicate the chief distinctions:—

5.5. Supra-anal lamina of female quadrate, and excised, or broadly subtrigonal, rounded, and entire. Heterogamidæ.

6. Male winged, female wingless.

A. Pronotum rounded in front, truncate behind. Supra-anal lamina quadrate, incised. *Heterogamia*, Burm.

B. Pronotum sinuately rounded in front, produced and broadly rounded behind. Supra-anal lamina broadly subtrigonal, rounded, entire. *Ataxigamia*, gen. nov.

6.6. Both sexes winged. Pronotum truncate in front, rounded behind. Supra-anal lamina quadrate, incised.

Homœogamia, *Burm.*

Ataxigamia, *gen. nov.* (*Ataxia* = confusion).

Male winged, female (?). Head prominent. Pronotum ciliate meso- and meta-notum, also underside of the thorax, coxæ, and femora more or less densely covered with long, silky hair. Pronotum rounded in front, slightly sinuate on each side of the hood-like middle part, gradually narrowing rearward, produced behind, apex broadly rounded; sides much deflexed anteriorly, margin slightly rough, disk with coarse, shallow impressions. Elytra and wings large, perfectly folded; elytra acuminate; wings with anal area fan-like. Legs and tarsi long and slender, claws small, arolia minute. Abdomen very much depressed, segments scarcely constricted, angles not produced, obtuse or rounded. Supra-anal lamina subtrigonal, hindmargin rounded, entire, nearly flat. Cerci very much longer than lamina, subterete, 16-jointed, finely pilose, obtuse. Subgenital lamina exceeding the upper, broad, hindmargin emarginate.

In the "Archiv für Naturgeschichte" Gerstäcker also describes a genus *(Gynopeltis)*, in which the fore femora alone are spined (Zool. Rec., VI., 461, 1864).

Ataxigamia Tatei, *spec. nov.*

Pale brownish-ferruginous, underside of body and the legs pale ferruginous-testaceous. Head pále, face hairy; antennæ brown, basal joints pale. Pronotum pale in front, dark behind. Elytra reddish-brown along the costa and at the base, paler beyond, veins with narrow deep-brown margins, veinlets whitish. Wings before the middle and all longitudinal veins smoky-brown, pale beyond, transverse veinlets whitish. Anterior femora with four spinelets, middle and hind femora unarmed. Styles inserted near posterior margin of subgenital lamina, very short, slender.

	Male.
Length of body	27 mm.
Length of elytra	35 "
Length of pronotum	8 "
Width of pronotum	11·5 "

Habitat.—Fowler's Bay, western coast of South Australia (legit Prof. R. Tate). S.A. Museum.

The principal aberrant characters consist in the fore femora alone bearing spines, the anal area of the elytra being narrow, and longer than in any other species, the anal area of the wings folding flabellately, and the supra-anal lamina being entire, rather long, and nearly flat.

B. Claws without arolia.

Panesthidæ (*Br.*, Syst., 384).

Head large, very broad, antennæ shorter than body, rather

thick. Pronotum semiorbicular, not quite covering the head, truncate in front, or emarginate in the middle ; disk more or less excavated. Elytra perfect, corneous, shining, constricted in the middle, or abbreviated, or none. Legs stout, femora unarmed, or the anterior ones only with a few teeth in some species ; claws large, arolia none. Abdomen thick, hindangles of dorsal segments obtuse. Supra-anal lamina broad, rounded. Subgenital lamina of male rounded or transverse, very narrow.

The family comprises four genera, each with only a few species, two being wholly or chiefly American, the others Indian and Australian ; and is the last in Brunner's system of the Blattariæ.

Panesthia, *Serville.*

Ann. Sc. Nat. Zool., XXII., 1831 ; *Br.*, Syst. 390, fig. 58.

"Black, very shining. Head large ; antennæ thick, scarcely longer than the pronotum. Pronotum transverse, emarginate and raised over the head, margins broad, disk more or less deeply excavated, and tuberculate. Elytra with costa more or less suddenly deflexed, constricted beyond the costal area leaving the sides of the abdomen and the scutellum visible ; veins indistinct except in the radial and anal areas. Coxæ and femora very thick, tibiæ with long spines. Abdomen very convex, coarsely punctured dorsally. Supra-anal lamina very broad. Cerci triangular, very short. Subgenital lamina of male small, transverse, without styles.

Of the species recorded by Brunner one is Australian, the others are from the Malay Archipelago, two of them, however, have since been proved to extend to the Northern Territory of South Australia, by specimens in the collection of the S.A. Museum.

Panesthia morio, *Burmeister.*

Hardb., II., 513; *Br.*, Syst., 392.

Body deep-black. Head black ; *ocelli, a band across the face, margin of labrum*, and *palpi* (partly) *yellowish ;* antennæ moniliform, *reddish.* Pronotum with frontal incision acute, margins deflexed, bi-tuberculate. Elytra *deep-brown*, veins distinct, pale, parallel towards apex. Legs *piceous* to *brown ;* fore femora ciliate, unarmed. Abdomen with last dorsal segment laterally dentate. Supra-anal lamina crowdedly toothed.

Female.	Brunner.	S.A. Mus.
Length of body... ...	33–52 mm.	36 mm.
Length of elytra ...	37 " (?)	39 "
Length of pronotum ...	8–12 "	12 "
Width of pronotum ...	12·5–18"	12 "

Habitat.—Java, Ceylon, Amboina *(Brunner);* Northern

Territory of South Australia *(S. A. Museum)*; New South Wales, Lord Howe Island *(Walker)*.

The specimen from which the above description was drawn up was presented by the Hon. S. Magarey in 1886, and differs only in the italicised particulars from Brunner's description.

PANESTHIA JAVANICA, *Serville* (loc. cit.).

Br., Syst., 393, fig. 58; *P. affinis*, Burm.; *P. æthiops*, Stăl; *P. quadrimaculata*, Walk. (larva).

"Black, very shining. Pronotum of male deeply and broadly incised in front with horn-like angles, middle dentate; incision of female triangular, sides and middle dentate. Elytra longer than the body, very shining, veins indistinct. Abdomen with last segment entire, hindangles produced, tooth-like. Supra-anal lamina denticulate. Larva with four spots.

	Male.	Female.
Length of body	31–45 mm.	42 mm.
Length of elytra ...	24–37 "	33 "
Length of pronotum ...	6–10 "	9 "
Width of pronotum ...	10–16 "	14 "

Habitat.—Java, Philippine Islands, Cambodia, Birma *(Brunner)*; India, Australia *(Walker*, Brit. Mus. Cat., 20)."

PANESTHIA TRANSVERSA, *Burm.*

Handb. II., 513; *Br.*, Syst., 395; *P. plagiata*, Walker (Brit. Mus. Cat., 21).

Black, shining. Pronotum with frontal incision of male deep, sides and middle horn-like elevated; of female much less deep, lateral and medial tubercles tooth-like, disk deeply excavated anteriorly, a curved transverse ridge behind the depression. Elytra with the costal area suddenly abbreviated before the middle, much narrowed beyond, margin dusky yellowish; a broad, interrupted, oblique yellow band before the middle.

	Male.	Female.
Length of body	25 mm.	30 mm.
Length of elytra	22 "	23 "
Length of pronotum ...	5·5 "	6 "
Width of pronotum ...	9·5 "	10 "

Habitat.—Java (*Burm.*); Ceylon (*Walker*); Northern Territory of South Australia.

The specimen of a male from which the description and measurements have been supplemented, was captured by my brother, Mr. J. P. Tepper, near Port Darwin, about 1874.

PANESTHIA AUSTRALIS, *Brunner* (Syst., 396).

Deep black; part of the underside brown. Pronotum of male

emarginate in front, margin incrassated, reflexed, disk with trifoliate excavation and four tubercles in the angles; of female subemarginate, margin not incrassated, or reflexed, disk almost flat, impression triangular, small. Supra-anal lamina with hindmargin entire. Elytra and wings of male much abbreviated, scarcely attaining the hindmargin of the metanotum, veins distinct; of female lobiform, almost obsolete.

	Male.	Female (*Br.*)	Male.	Fm. (*mihi*).
Length of body ...	31 mm.	28 mm.	29 mm.	28 mm.
Length of elytra ...	?	?	8 "	7 "
Length of pronotum	7 "	6·2 "	6·5 "	6 "
Width of pronotum	11 "	9 "	11 "	9 "

Habitat.—Sydney, New South Wales; Moreton Bay, Queensland (*Brunner*); Ardrossan, Yorke's Pen., South Australia (*Cadd*); Kewell, N.W. Victoria (*Jas. Hill*).

I observed and collected this species already in 1898-80, usually at the foot of perpendicular faces of cliffs along the seashore, but beyond the direct action of the waves, either embedded in the loose abraded detritus or concealed under clods of earth and in fissures. The insects were, however, by no means abundant. The female specimen from Kewell (200 miles inland) appears to be a nymph, the elytra and wings being lobiform and not free, of nearly equal length. The former extend barely to the hindmargin of the metanotum, the latter to that of the second abdominal segment, both with the veins quite distinct.

Respecting the elytra and wings of the adults, Brunner remarks that they were mutilated in his specimens, but of the ordinary type. This appears not to be the case either in regard to the mutilation or that they ever have perfect organs of flight. The adult male specimen in the collection of the S.A. Museum presents also a *mutilated* appearance, but when closely examined with a strong lense it is seen that the edges of elytra and wings are quite smooth, and rounded, notwithstanding their broken appearance, and it is my opinion that this is their normal form.

Panesthia cribrata, *Saussure* (Rev. et Mag. Zool., 1864, p. 31), Australia.

Panesthia Kraussiana, *Saussure* (Mem. Soc. Phys. de Genéve, 1873).

Habitat.—Melbourne, Victoria.

Panesthia laevicollis, *Saussure* (ibid).

Habitat.—Australia.

On a New Mineral (Stibiotantalite).

By G. A. Goyder, F.C.S., Assayer, School of Mines.

[Read April 4, 1893.]

Some samples of this mineral were given to Mr. J. J. East, Registrar of the School of Mines and Industries, by Mr. Knox Brown, of Bunbury, West Australia, the latter explaining that although the sluiced tin-ore from the alluvial at Greenbushes appeared to the miners of a fair, even character as regards freedom from associated minerals, the assay values from Melbourne varied in a most irregular manner. Mr. East's attention was taken with part of the sample submitted, which had been called locally "pale tin" and "resin tin." On being submitted to a preliminary examination in the School Laboratory this was found to contain antimony, but did not appear to have the properties of any of the ordinary antimonial minerals.

Mr. East then handed it to me for analysis, the result of which was as follows:—

Tantalic acid, Ta_2O_5	... ...	51·13 per cent.
Niobic acid, Nb_2O_5	... ...	7·56 "
Antimony oxide, Sb_2O_3	...	40·23 "
Bismuth oxide, Bi_2O_3	... ...	0·82 "
Nickel oxide, NiO	... ...	0·08 "
		99·82 "

From the above analysis it appears that the mineral consists essentially of tantalate of antimony, part of the tantalic acid being replaced by niobic acid, and part of the antimony by bismuth.

No record could be found in any of the text-books of mineralogy of any mineral constituted as above, and in none of the published analyses of the tantalates is there a trace of antimony reported.

Physical Properties, &c.

The specific gravity of different samples of the mineral was found to vary from 6·47 to 7·37, the latter being the S.G. of the sample analysed. All the specimens were waterworn, and although some of them, if not all, were crystalline, the form could not be determined. Fracture uneven to sub-conchoidal

with an adamantine lustre, which, after long exposure, appears resinous. Hardness, 5 to 5·5. Brittle. Infusible, and on charcoal *per se* yields only a faint sublimate. With soda on charcoal easily reduced to metallic antimony, the tantalic acid forming a fusible slag with the soda.

An analysis of the specifically lighter portion is being made, and I anticipate that this will contain a larger proportion of niobic acid, if indeed it should not prove to be principally a niobate.*

I propose the name of "Stibiotantalite" for this new mineral-species, which is expressive of its chemical composition.

---

* The analysis of the second sample has been completed, and the lighter specific gravity found to be caused by an intermixture of impurities, principally silica; the relative quantities of tantalic and niobic acids and oxide of antimony being approximately the same as in the foregoing analysis.—G. A. G., April 24, 1893.

A New Parasite of the Black Scale (Lecanium testudo).

By J. G. O. Tepper, F.L.S., &c.

[Read April 4, 1893.]

The Black-scale is well-known as a most annoying and often destructive insect of the Coccidæ, attacking many trees and garden plants, such as Dodonaea, Abutilon, Tecoma, Pelargonium, Wormwood, &c. The eggs hatch in January and February, when the minute, almost microscopical larvæ spread rapidly over the plants, actively assisted by the ants, which usually denote their whereabouts. From this time, and after fixing themselves to certain spots, they grow rapidly till attaining the full size of about one-sixth inch diameter, exhausting the plants by sucking. On January 22nd last, Mr. Edwin Smith brought to me at the Museum some live adult scale-insects and two lively little pale caterpillars he said he had found with them. Not being able at the time to identify them, the scales and the larvæ were put by themselves in a box, covered with glass, and almost forgotten for some time. The latter, however, in a week or two had disappeared. On March 31, on again examining the box two moths were found to have hatched from as many cocoons of white silk concealed under the dark empty shells of the scale-insects.

These were identified by Mr. H. H. Lower, jun., as *Thalpochares dubia*, Butler, of which the food or host had not been known. This is, therefore, another lepidopterous larvæ convicted of carnivorous habits. Its near relation, *Thalpochares coccophaga*, Meyr., is known to feed upon *Eriococcus eucalypti*, the small white-scale; which produces the silky appearance of the Redgum Eucalypts in our Park Lands, and usually but erroneously ascribed to various other causes.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read April 4, 1893.]

XIII.

The following pages furnish descriptions of new species, for one of which I have found it necessary to propose a new generic name. They also contain a number of notes on synoymy, &c.

LAMELLICORNES.

PSEUDORYCTES.

P. Mullerianus, White. I have recently seen several examples (all males) of a *Pseudoryctes*, all of which I believe to belong to this species, although they differ considerably in size and in the degree of development of the male characters. In one example the horns of the prothorax are longer than in the others, the middle horn being bifid at the apex. These specimens all come from North Queensland, and (except one generously presented to me) are in the cabinet of Mr. French, of Melbourne.

BUPRESTIDÆ.

PARACEPHALA.

P. cyaneipennis, sp. nov. Sat elongata; subcylindrica; subnitida; ænea, elytris sat læte cyaneis; subtus pilis albidis vestita; capite longitudinaliter sat profunde canaliculato sat crebre striatim ruguloso; prothorace transversim ut caput ruguloso, quam longiori dimidio latiori, inæquali (transversim et longitudinaliter plus minusve sulcato et pone medium in disco obscure 2-tuberculato); elytris crebre subtiliter granuloso-rugulosis, postice singulatim rotundatis et obscure crenulatis. Long., 4 l.; lat., $1\frac{1}{5}$ l.

Apart from colour, this species differs from that which I take to be *P. murina*, Thoms. (and also from *P. ænea*, Blackb.), by the much deeper frontal sulcus of its head. In this character it agrees with *P. pistacina*, Hope.

New South Wales; Sydney; bred by Mr. Froggatt from galls on *Casuarina distyla*.

CLERIDÆ.

AULICUS.

A. parvulus, sp. nov. Nitidus; setis elongatis vestitus; obscure cyaneus, elytris æneis, antennis palpisque testaceis, pedibus piceis (tibiis tarsisque anticis rufescentibus); capite antice crebre postice sparsim punctulato; prothorace quam longiori vix latiori sparsim punctulato; elytris crasse (ad basin et ad apicem minus crasse) subseriatim punctulatis transversim fortiter rugulosis. Long., $2\frac{2}{5}$ l.; lat., $\frac{4}{5}$ l.

This species is characterised by small size, unusual colours (general colour cyaneous, elytra of a bright bronzy tone, antennæ testaceous, legs piceous), and extremely coarse puncturation of elytra, which is only a little less coarse about the base and apex, and which does not run very distinctly in rows owing to the coarseness of the transverse rugulosity.

Victoria; sent to me by Mr. Lower.

BOSTRYCHIDÆ.

XYLOPERTHA.

X. canina, sp. nov. Femina (?). Brevis; cylindrica; minus nitida; picea, prothorace elytrisque antice et pedibus rufescentibus, antennis testaceis; capite sat elongato, longe setoso, postice longitudinaliter sat crebre strigato; antennis prothorace vix brevioribus; prothorace elytrorum latitudine quam longiori parum latiori, antice sat angustato, postice sparsius minus subtiliter punctulato, antice crebre granulato-ruguloso tuberculis nonnullis majoribus intermixtis (præcipue latera versus), utrinque unco supra oculum armato; elytris confertim sat fortiter punctulatis, inter sculpturam fortiter rugatis, postice subito oblique declivibus; elytrorum parte declivi plana fere circulari, carina circumcincta, apice deorsum producta, sutura utraque carinata et in medio ut spina elongata (hac ad apicem extrorsum curvata) retrorsum producta, humeris lævibus. Long., $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

Viewed from the side this species has a rough resemblance in outline to a dog, the spines protruding from the apical declivity appearing as a single projection, and representing the animal's tail. It is evidently congeneric with the species that I described in Proc. L.S., N.S.W., 1889, pp. 1264, &c., as *Xyloperthæ*. As I am not sure of the sex of the example before me, and do not see any immediate prospect of obtaining more specimens, I think it is well to describe it, notwithstanding that I think it probably a female (on account of its front tarsi not being clothed with long

hairs as they are in the only congeneric example I have seen, that I feel sure is a male).

N.S. Wales; Blue Mountains.

TENEBRIONIDÆ.

DOCALIS.

D. maculatus, sp. nov. Sat elongatus; sat parallelus; nigro-piceus, elytris pone medium macula obscura ferruginea ornatis; setis brevibus erectis nigris et nonnullis adpressis pallidis vestitus, his maculatim sat crebre condensatis; capite prothoraceque confertim sat subtiliter granuloso-punctulatis; hoc inæquali postice leviter angustato, lateribus leviter subconcavis; elytris sat fortiter striato-punctulatis, interstitiis alternis quam cetera latioribus. Long., $2\frac{1}{5}$ l.; lat., $\frac{7}{10}$ l.

N.S. Wales; Blue Mountains.

COTULADES.

C. montanus, sp. nov. Niger, prothorace albo-bivittato, pedibus rufis; supra setis validis sat brevibus vestitus, his in elytrorum costis hic illic fasciculatis; capite prothoraceque crassissime punctulatis, puncturis singulis setis singulis granuliformibus instructis; elytris seriatim crassissime profunde punctulatis et sub-tricostatis. Long $1\frac{1}{5}$ l.; lat., $\frac{3}{5}$ l.

This minute species is among the smallest of the *Tenebrionidæ*. It seems to be near *C. fascicularis*, Pasc., but is much smaller, with red legs and a fairly well-defined vitta (formed by white setæ) of a somewhat curved form on either side the middle line of the prothorax, &c.

N.S. Wales, Blue Mountains.

MENEPHILUS.

M. sydneyanus. Elongatus, sat parallelus; sat nitidus; niger nonnullorum exemplorum antennis pedibusque picescentibus; capite crebre subtilius punctulato, fronte sat fortiter longitudinaliter impresso; prothorace leviter transverso, ante basin transversim leviter impresso et ad basin utrinque foveolato, a basi antrorsum (leviter arcuatim) parum angustato, margine antico bisinuato et in medio minute leviter emarginato, angulis omnibus acutis sat productis; elytris quam prothorax haud multo latioribus, leviter striatis, striis sat fortiter punctulatis, interstitiis subtilissime punctulatis, angulis humeralibus fere rectis.

Mas. Tibiis anticis ad apicem intus fortiter curvatis. Long., $4\frac{4}{5}$—5 l.; lat., $1\frac{3}{5}$—$1\frac{4}{5}$ l.

The prothorax not narrowed and laterally sinuate behind and

also the more convex build gives this species an appearance somewhat different from those of the Australian species known to me that have been attributed to *Menephilus*, but I cannot find any character whereby to distinguish it from them (e.g., *M. colydioides*, Er.).

N.S. Wales, near Sydney; also in the Blue Mountains.

CISTELIDÆ.

ALCMÆONIS.

A. punctulaticollis, sp. nov. Sat elongata; capillis erectis albidis nonnullis vestita; niger, (exempli typici) prothorace elytrisque læte purpureis, labro mandibulis palpis antennarum basi pedibusque læte testaceis; capite sat fortiter, prothorace multo minus fortiter, crebre punctulatis; elytris punctulato-striatis, interstitiis sat convexis et inæqualiter punctulatis.

Mas. Antennis quam corporis dimidium sat longioribus; femoribus compressis, posticis subtus (in medio angulatim) dilatatis, tibiis posticis intus planatis et fortiter bisinuatis.

Femina latet. Long., $4\frac{1}{5}$ l.; lat., $1\frac{1}{5}$ l.

This species seems to present the feeble distinctions from *Atractus* on which the genus *Alcmæonis* was established. It appears to differ from *A. pulchra*, Bates, considerably in color, the prothorax of that species being described as castaneous with some black markings, and the elytra as green with purple reflections and silky golden pubescence, whereas in the present insect the prothorax and elytra are of uniform bright purple color and the thinly dispersed hairs on the latter are whitish. The prothorax of *A. pulchra* is said to be longer than wide, whereas that of *A. punctulaticollis* is (by measurement) slightly wider than long. Even if it should prove to be a variety of *A. pulchra*, it seems desirable that the present insect should be described, as no description has hitherto appeared of a male *Alcmæonis*.

Victoria; Alpine district.

LICYMNIUS.

L. bicolor, sp. nov. Mas. (?). Elongatus; breviter minus crebre pubescens; niger vix cyaneus, prothorace læte rufo, palpis femorum anticorum basi et genubus omnibus rufescentibus; capite fortiter minus crebre punctulato; prothorace leviter transverso, longitudinaliter vix impresso, ante basin mediam leviter foveolato, subfortiter minus crebre punctulato, antice angustato, lateribus leviter arcuatis, basi manifeste sinuata, angulis posticis distinctis obtusis; elytris ad basin quam prothoracis basis haud multo latioribus, suturam versus

manifeste latera versus haud manifeste striatis, fortiter (fere ut caput) crebre punctulatis, puncturis subseriatim dispositis; antennis sat elongatis sat compressis; tibiis anticis leviter flexuosis. Long., $2\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

S. Australia; Adelaide District.

ANAXO.

A. sydneyanus (? *æreus*, Blackb., var.). Femina. Ab *æreo* differt prothoracis lateribus paullo minus arcuatis, antennis (nonnullorum exemplorum articulo 2° rufescenti excepto) totis nigris.

I took three specimens of this insect on flowers near Sydney, and am in doubt whether it should be regarded as a distinct species or merely a local race of the Victorian *A. æreus*, Blackb. I have seen a good many females of the latter, in all of which the antennæ have all the joints, except the first and the apical two or three, bright-red in their basal half (in some specimens almost entirely red), while in all these Sydney examples the antennæ are quite black, except that in one of them the second joint is a little reddish, the sides of the prothorax at the same time being certainly straighter, which makes that segment appear a little more elongate. Since I described *A. æreus* I have obtained a specimen which I regard as the male of that species. It differs from the female in being much smaller (long., $3\frac{1}{4}$ l.), and in having its antennæ and femora black, and its hind tibiæ considerably dilated. It must be remarkably like the insect which Mr. Bates described as *Chromomæa unicolor*, but it is certainly, I think, the male of *Anaxo æreus*, and I feel convinced that *A. æreus*, female, cannot be separated generically from *A. brevicornis*, Bates (the type of the genus), of which its author says that he had seen only the female—indeed, *A. æreus* and *brevicornis* are very close even as species, though certainly distinct.

PYTHIDÆ.

TRICHOSALPINGUS.

T. obscurus, sp. nov. Oblongo-ovatus; minus nitidus; subtiliter pubescens; crebre (prothorace minus crebre) punctulatus; obscure brunneus, tarsis testaceis; antennis prothoracis basin attingentibus; prothorace quam caput vix latiori, sat transversim quadrato, ante basin utrinque leviter impresso; elytris quam prothorax basi multo latioribus, a basi longe ultra medium leviter dilatatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

Very like *T. brunneus*, Blackb., but much smaller, differently coloured, and having the puncturation of the prothorax much less crowded, and the basal impressions of the same very much feebler.

N.S. Wales; Blue Mountains.

ŒDEMERIDÆ.

PSEUDANANCA (*gen. nov.*).

Palporum maxillarium articulus apicalis magnus securiformis; labrum transversum antice subtruncatum; caput antice paullo elongatum; oculi magni prominuli rotundati sat grosse granulati; antennæ prope oculos insertæ, 11-articulatæ (?), capillis elongatis erectis vestitæ, articulis 4-10 (?, articulis 10°, 11° que exempli typici amissis) intus ante apicem sat fortiter angulatim productis; prothorax subcylindricus; elytra sat elongata, coxæ intermediæ et posticæ minus inter se approximatæ; tibiæ vix manifeste ad apicem spinosæ; tarsi sat graciles, articulo penultimo subtus sat fortiter sat anguste producto, intermediis subtus capillis perlongis vestitis; unguiculi fere simplices, ad basin paullo dilatati; corpus breviter pubescens.

The very small heteromerous beetle for which I propose this new name is difficult to place satisfactorily. The following characters in combination seem, however, to point to the *Œdemerides* as its allies, viz., anterior coxæ strongly prominent and open behind, claws simple (or nearly so), eyes entire, head not narrowed into a distinct neck behind the eyes, penultimate joint of tarsi strongly produced under the apical joint, hind coxæ considerably separated from each other. The most puzzling character is the very considerable separation *inter se* of the intermediate coxæ, which, however, are shaped as those of *Ananca*. In some respects this species seems to be near *Ithaca*, Olliff, but it cannot be referred to that genus, even if it be a female (though I think it is a male) on account, *inter alia*, of the penultimate joint of its tarsi not being bilobed. It is an elongate insect of decidedly *Œdemerid* facies.

P. ruficollis, sp. nov. Sat elongata, minus parallela, breviter subtiliter pubescens; sat opaca; nigra, prothorace femorum basi tibiis tarsisque (his 2 plus minusve infuscatis) rufis, antennis basin versus picescentibus; supra sat æqualiter sat crebre sat fortiter punctulata; capite (oculis inclusis) quam prothorax paullo latiori; hoc leviter transverso subcylindrico supra inæquali; elytris quam prothorax duplo latioribus; antennis quam corporis dimidium sat longioribus; metasterno crasse fortiter sat crebre, abdomine minus fortiter magis crebre, punctulatis; femoribus posticis (? maris) a basi fere ad apicem albidis et confertim pubescentibus. Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

N.S. Wales; Blue Mountains.

SESSINIA.

S. sublineata, Waterh. I have a short series (taken on flowers

on the Blue Mountain range) of a species which I cannot separate from the Tasmanian *S. sublineata*. It is, however, considerably smaller, the largest examples being less than two and a-half lines long.

MORDELLIDÆ.

MORDELLA.

M. inusitata, sp. nov. Dense cinereo-pubescens; capitis pube in disco infuscata, prothoracis longitudinaliter in medio infuscata, elytrorum antice maculatim et in parte dimidia postica tota (fascia ante-apicali angusta excepta) infuscata; pedibus anterioribus 4 testaceis, tarsis posticis antennisque rufescentibus; aculeo et abdominis apice nigris; prothorace quam longiori sat latiori. Long., 2 l.; lat., $\frac{4}{5}$ l.

A peculiarly coloured species devoid of the shining sericeous tone so usual in the genus. The whole insect is densely clothed with ashy pubescence, which is somewhat variably shaded in certain parts to a more or less dark-brown colour; this dark-brown shading occupies the greater part of the hind half of the head; it forms two narrowly separated lines down the middle of the prothorax; and on each elytron it appears as three elongate spots side by side close to the base, an indistinct narrow zigzag fascia a little behind the spots, a well-defined wide fascia immediately behind the middle, and a variable blotch or cluster of spots filling up the greater part of the apical fifth-part, and separated from the post-median fascia by a narrow zigzag fascia-like interval of the general pale-ashy colour.

This insect perhaps resembles *M. mixta*, Fab., but I do not think it can be identical with it, as that species is said to be "major," and is described as having a *black* ("atra") spot on either side of the prothorax, and a *red* fascia on the elytra. Also perhaps resembles *M. promiscua*, Er., which species, however, is said to have black legs and antennæ, and black tomentum on the sides of the prothorax and of the abdomen, &c., &c.

N.S. Wales, Sydney; on flowers.

M. maculatissima, sp. nov. Robusta; nigra; dense nigro-pubescens; supra maculis parvis plurimis albido-pubescentibus ornata, corpore subtus plus minusve albido-pubescenti, ore et antennarum basi læte rufis; prothorace quam longiori sat latiori. Long., $3\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

A fine robust species, above the average size. The prothorax and elytra are covered with a large number of small spots, formed by white pubescence (there are at least 40 on each elytron), some of which coalesce here and there, forming larger spots. Probably this coalescence of the spots is variable; in the typical specimen those along the base of the elytra are a good

deal (but irregularly) run together, those near the suture a little behind the scutellum coalesce into a kind of common cluster, and two or three coalesce near the apical part of the lateral margins, the larger spot thus formed being isolated on one elytron and on the other sending out an extension (*i.e.*, running into another spot), which is almost connected with a spot close to the suture. The pubescence of the head, legs, and undersurface appears to be black or whitish, according to the point from which it is looked at.

This species is probably near *M. pulverulenta*, Macl., from N. Queensland, which seems to be the only other described Australian species with the markings of the upper surface consisting of a great number of small white spots (*M. multiguttata*, Waterh., is described as having only seven spots, and those yellow, on each elytron). *M. pulverulenta* appears to be a much smaller species (long., 2 l.), and is described (its white pubescence excepted) as entirely black, saving the front legs, piceous. As the front legs of the present species are of the same blackish color as the other legs, and the mouth and base of the antennæ are bright red, it may be assumed that these characters, together with the very different size and habitat, point to specific distinctness.

N.S. Wales; on flowers near Sydney.

M. cara, sp. nov. Nigra; dense nigro-pubescens; capite prothorace postice et ad latera, elytrorum basi (hac anguste) sutura antice macula ovali discoidali (hac paullo pone basin posita) macula antemediana (hac V reversam simulanti) et macula transversa ante apicem posita, læte aureis; corporis subtus lateribus abdominis maculis parvis lateralibus tibiisque posticis argenteis. Long., 2 l.; lat., $\frac{4}{5}$ l.

It seems impossible to find any distinctive characters for many of the very numerous Australian species of *Mordella* apart from colour, markings, and size, all of which, however, as far as my observations go, appear to be fairly constant. Of the present species I have seen several examples all quite identical. Their distinctive characters appear to be *(a)* strongly contrasted silvery pubescence of the under surface, and golden of the upper; *(b)* conspicuous golden colour of the front one-fifth part of the suture; *(c)* the sharply-defined brilliant golden spot near, but not joined to, the base on the disc of each elytron; *(d)* the entire absence of any rufous colouring of the legs and antennæ, even the latter scarcely tending to a piceous tone—this, however, being possibly only sexual.

N.S. Wales; near Sydney.

M. sydneyana, sp. nov. Nigra; dense nigro-pubescens; capite, prothorace (linea media et macula utrinque exceptis),

elytrorum basi anguste sutura antice macula elongata discoidali basin attingenti macula antemediana lunata et macula postmediana rotundata læte argenteis; corpore subtus (certo adspectu) toto argenteo-pubescenti; ore palpis antennarum basi et femoribus anticis rufis. Long., 2 l.; lat., $\frac{4}{5}$ l.

This species is near *M. communis*, Waterh., but is narrower and more elongate, and with markings so different that even if the discovery of intermediate forms should bring the two together it would be convenient to call it by a distinctive name. The silvery markings of the elytra are extremely sharply defined and conspicuous, consisting of a short narrow vitta on the front part of the suture, and on each elytron the following:—A short wide vitta running hindward from the middle of the base, a semilunar spot (its convex side forward) close in front of the middle, and a round spot distant from the suture considerably in front of the apex. The markings differ from those of *communis* in there being no isolated spot behind the base, in a large semilunar spot taking the place of the two small spots in front of the middle, and in the hindmost spot being larger, rounder, not nearly so close to the suture, and not quite so near the apex. This is not the "var. ?" of *communis* from Sydney mentioned by Mr. Waterhouse (Tr. E. S., 1878, p. 231).

N.S. Wales; near Sydney.

M. Baldiensis, Blackb. (Tr. R. Soc. S.A., 1891, p. 341). I have taken specimens of a *Mordella* near Sydney, and also on the Blue Mountain Range, which I cannot separate from this Victorian species except by their very small size (long., 1 l.). I suspect, however, that they represent a distinct species, especially as some examples have the antennæ and front legs decidedly rufescent—probably a sexual character which I find scarcely marked in *Baldiensis*.

PHYTOPHAGA.

CHEILOXENA.

C. Frenchæ, sp. nov. Elongata; convexa; opaca; picea, squamis piliformibus griseo-brunneis (his in prothorace crebre, in elytris minus crebre-sed hic illic maculatim condensatis—dispositis) vestita; prothorace quam latiori fere longiori, utrinque ante medium crista insigni ornato, ad latera haud dentato; elytris subfortiter vix seriatim punctulatis, tuberculis sat numerosis ornatis (ex his in utroque elytro quam ceteri magis insignes quinque—sc. alio humerali, alio subbasali prope suturam, alio antemediano prope suturam, aliis 2 fere contiguis transversim positis postmedianis). Long., 7 l.; lat., 3 l.

This extremely distinct species was taken by Mrs. French, of Melbourne. As will be seen by the above description, it is so distinct from *C. Westwoodi*, Baly, that it can hardly be necessary to specify the difference. The prothorax is of very peculiar form, an ill-defined ridge commencing near the base on either side, very wide of the middle line, and running obliquely forward for a certain distance, until its direction (near the front) becomes parallel to the middle line, and at the same place the ill-defined ridge changes into a very strongly elevated crest. The base of the elytra is nearly twice as wide as the widest part of the prothorax. The absence of lateral teeth from the prothorax is noteworthy, as M. Lacordaire regards their presence as a generic character. There is, however, no doubt about this insect being congeneric with *C. Westwoodi*.

Victoria; Latrobe R. District.

MICRODONACIA (gen. nov. *Donacidarum*).

Gen. *Donaciæ* affinis; differt capite antice minus productum, femoribus minus elongatis sat incrassatis, unguiculis parvis appendiculatis divaricatis.

The minute insect for which I propose this new generic name is certainly, I think, very close to *Donacia*. I have not been able to devote a specimen to dissection, and so am not able to state positively that the parts of the mouth requiring dissection for their examination (*e.g.*, the ligula and mentum) are exactly as in *Donacia*, but with this reservation, the characters of *Donacia* given by Dr. Chapuis (Gen. Col., X., p. 57), with the exceptions noted above, are the characters of the present species. It may be at once distinguished among the *Phytophaga* by the following characters in combination:—Long slender antennæ inserted well in front of the eyes and notably nearer to the centre line of the head than is the inner margin of the eyes, base of prothorax much narrower than base of elytra, prothorax not distinctly margined laterally, anterior coxæ almost contiguous, claws appendiculate.

M. incerta, sp. nov. Colore variabilis, testacea vel brunnea plus minus æneo-vel viridi-micans; minus nitida; sat elongata; capite prothoraceque fortiter crebre sat rugulose punctulatis; illo sat brevi sat æqualiter leviter convexo; oculis modice convexis, quam antennarum articulorum 3^{i} 4^{i} que conjunctorum longitudine fere magis inter se remotis; antennis quam corporis dimidium (maris multo, feminæ vix) longioribus, articulo basali sat incrassato, 2° 3° que brevioribus inter se æqualibus, 4° quam basalis longiori, ceteris inter se et basali longitudine subæqualibus; prothorace vix transverso, ante basin transversim subsulcato, antice quam postice vix

latiori, lateribus antice subtiliter submarginatis mox ante medium fortiter angulatim dilatatis; elytris trans humeros quam prothoracis basis fere duplo latioribus, setis erectis sparsim vestitis, sat fortiter punctulato-striatis, interstitiis sublævibus; pedibus minus elongatis; femoribus sat dilatatis, anticis dente sub obsoleto intermediis dente sat perspicuo posticis dentibus 2 magnis (his transversim positis) subtus armatis; tibiis sinuatis ad apicem subdilatatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{2}$ l. (vix).

Victoria; in marshy places on the higher mountains of the Alpine district.

CRYPTOCEPHALUS.

C. Chapuisi, Baly. This species is certainly, I think, the same that Dr. Chapuis named *C. iridiventris*. I have been able to examine a type from Dr. Chapuis' collection through the courtesy of M. Severin, of Brussels. The two descriptions are in almost identical language. They were published in the same year (1877), Dr. Chapuis' apparently before Mr. Baly's. I think this synonymy has not been previously noted.

EROTYLIDÆ.

LANGURIA.

L. Vandepolli, Fowler. There can hardly be a doubt that this species was founded upon the insect which von Harold had previously described as *L. vulgaris*. I believe this synonymy has not yet been recorded.

COCCINELLIDÆ.

RHIZOBIUS.

R. major, Black. In Trans. Roy. Soc. S.A., 1892, p. 253, line 11, for "general form" read "pubescence."

R. cæruleus, Blackb. This name was incorrectly printed, *R.* "*cærulens*," *vide* Tr. Roy. Soc., S.A., 1892, p. 256.

GYMNOSCYMNUS.

G. quadrimaculatus, Blackb. In describing this species (op. cit., p. 242) I accidentally omitted to say that it is found in N.S. Wales.

Descriptions of a New Genus and Five Species of Australian Nitidulidæ and Colydiidæ.

By E. Grouvelle.

[Read April 4, 1893.]

[This memoir is founded on certain species that I forwarded to M. Grouvelle, the eminent French coleopterist, who has made a special study of the group of families generally known as *Clavicornes*. I was unable to refer them to any known genera, but as many of the genera in this group of families are of very wide distribution, I deemed it safer to place them in the hands of a high authority, who is a specialist on the *Clavicornes* of the world, than to risk the possibility of my overlooking their connexion with some existing genus of which I had not seen a type. M. Grouvelle finds them all to be new species, and is able to refer confidently to existing genera only three of them. I have at least one example of them all in my collection. M. Grouvelle has taken the opportunity of this memoir to describe an additional new species from Australia in his own collection.—T. Blackburn.]

NITIDULIDÆ.

Ericmodes* australis, *n. sp.*

Oblongo-elongatus, convexus, griseo-pubescens, fulvo-ferrugineus, antennis pedibusque dilutioribus, elytris nigro-maculatis; capite prothoraceque crebre punctatis, fronte convexiuscula; prothorace transverso, antice et postice coarcto; lateribus arcuatis, anguste marginatis; angulis anticis rotundatis, posticis obtusis; margine antico arcuato, postico truncato; basi utrinque prope angulos posticos foveolata; elytris subparallelis, ad apicem conjunctim rotundatis, prothorace vix latioribus; anguste marginatis, punctato-striatis; stria scutellari brevi; intervallis planis. Long., 5 mill.

Allongé oblong, convexe, couvert d'une pubescence grise couchée, plus dense sur les elytres, roux ferrugineuse, un peu enfumé varié de petites taches noires sur les elytres. Antennes et pattes plus claires. Tête transversale; yeux gros, assez saillants, marge antérieure tronquée, ponctuation serrée. Articles 1 à 5 des antennes plus longs que larges; 6 à 8 moniliformes, 9 à 11

* Ericmodes, Reit., Zool. Bot. Gesell, Wien, 1877, p. 167.

formant une massue bien marquée. Prothorax environ deux fois aussi large que long, rétréci à la base et au sommet ; marges latérales regulièrement arqués etroitement rebordées ; marge antérieure arquée, postérieure tronquée ; angles antérieurs arrondis, postérieure obtus ; ponctuation dense, semblable à celle de la tête ; une impression de chaque côté, le long de la base, prés des angles postérieurs. Ecusson transversal, densement pubescent. Elytres un peu plus larges que le prothorax, en ovale tres allongé, arrondis ensemble au sommet, 2 fois $\frac{1}{2}$ aussi longs que larges, ponctués striés ; stries bien marquées jusqu' au sommet ; intervalles plans ; un rudiment de strie à côté de l'ecusson. Profil des elytres légèrement concave vers le sommet.

S. Australia. Trouvé dans les fentes de l'ecorce du *Santalum acuminatum*.

CRYPTARCHA DEPRESSA, *n. sp.*

Ovata, depressa, sat nitida, pubescens, nigro-picea ; margine antico capitis, lateribus prothoracis et elytrorum, lata plaga humerale et pygidio rufo-ferrugineis ; antennis pedibusque rufo-testaceis ; capite prothoraceque sat dense punctatis, epistomo bi-impresso ; prothorace transverso, antice angustato, lateribus arcuatis, margine antico subtruncato, postico subemarginato ; disco in longitudinem levi et obtuse subcarinato ; elytris ovatis, ad apicem truncatis, punctato-striatis ; intervallo secundo, basin versus latiore et elevato. Long., 1 mill. $\frac{1}{2}$ à 2 mill. $\frac{1}{2}$.

Ovale, déprimé, assez brillant, couvert d'une pubescence flave, couchée, assez dense, disposée en lignes sur les elytres, brun de poix ; marge antérieure de la tête, bord latéraux du prothorax et des elytres une large tache humerale et pygidium roux-ferrugineuse ; antennes et pattes un peu plus claires. Antennes gréles, massue bien marquée. Tête et prothorax assez densement ponctués ; epistome bi-impressionnés, mandibules bi-dentées à l'extrémité. Prothorax tres transversal, pars plus large que la tête en avant, prèsentant sa plus grande largeur à la base ; bord antérieur presque droit, légèrement sinué de chaque côté, bords latéraux régulierement arqués, sensiblement elevés, base subèchancrée, rebordée ; sur le milieu du disque un espace longitudinal lisse, faiblement relevé en carène obtuse. Ecusson demi-circulaire. Elytres deux fois plus longs que le prothorax aussi larges à la base, subparallels les $\frac{2}{3}$ de leur longueur puis progressivement rétrécis, tronqués au sommet, laissant à découvert le dernier segment de l'abdomen, ponctués striés ; stries bien marquées jusqu' au sommet ; 2me intervalle à partir de la sutura plus large et légèrement relevé dans la partie basilaire. Pattes comprimées. Mesosternum non caché, longitudinalement bi-

sillonné. Metasternum avec un large impression longitudinale, peu profonde.

S. Australia. Sous les écorces des Eucalyptus.

La tache humérale ne paraît pas constante chez cette espèce. Nous n'avons pas cru nécessaire de créer un genre nouveau pour cette nouvelle forme de Cryptarcha qui se trouve très nettement caractérisée par son corps presque complètement déprimé.

COLYDIIDÆ.

Todima, *n.g.*

Caput basi constrictum, haud deflectum; oculis magnis, productis; antennis prope oculos et submargine frontis insertis, 11-articulatis, clava bi-articulata, sulcis antennarum nullis; caris coxarum anticarum conclusis; processu prosterni coxas superante; segmentis abdominis 1—2 reliquis longioribus; tibiis ad apicem spinosis, tarsis sat elongatis, 1° articulo longiore, 3° brevissimo.

Ce genre ne fait parti d'aucune des sous groupes indiqués par Lacordaire; il vient se placer entre les Synenitodes proprement dits et les *Acropis*, *Lemnis*, &c.

Todima fusca, *n. sp.*

Elongato-oblongato, leviter convexa, pubescens, fusca, antennis pedibusque dilutioribus; capite prothoraceque subopacis, fronte depressa; prothorace transverso, angulis anticis rotundatis, posticis obtusis, apice et lateribus arcuatis, basi in medio truncata, utrinque late emarginata; disco depresso, juxta basin bipunctato; scutello transverso; elytris oblongis, basin versus prothorace vix latioribus, apice obtuse acuminatis, punctato-striatis, intervallis 3 et 6 latioribus. Long., $3\frac{1}{2}$ mill.

Ovale très allongé, faiblement convexe, brun-noir; pattes et antennes plus claires. Tête transversale, un peu rétréci en avant, opaque, couverte d'une pubescence grise, couchée assez dense; yeux presque contre les angles postérieurs, front déprimé, limité en arrière par une brusque depression. Prothorax tres peu brillant, transversal, plus large que la tête y compris les yeux, arrondi latéralement, présentant sa plus grande largeur en avant du milieu; angles antérieurs largement arrondis, postérieurs obtus; bord antérieur arqué en avant, postérieur tronqué dans le milieu, largement sinué de chaque côté; disque déprimé, marge antérieure légèrement relevé dans le milieu, marge postérieure avec un point enfoncé, de chaque côté, au niveau du commencment du sinus latéral; pubescence couchée, assez dense surtout sur les côtés, orientée dans des directions convergentes vers la ligne médiane

du prothorax. Ecusson transversal, arrondi au sommet. Elytres brillantes, ovales, plus de trois fois plus longs que larges, un peu plus larges à la base que le prothorax, obtusement acuminés ensemble au sommet ; ponctués striés ; stries fines ; intervalles trois et six plus larges ; striè scutellaire assez courte ; pubescence couchée, plus fine que celle de la tête et du prothorax, disposée en lignes. Dessous brun, brillant.

King George's Sound, West Australia.

TODIMA RUFULA, *n. sp.*

Elongata, fere parallela, vix convexa parce pubescens, rufula ; capite, disco prothoracis, et lateribus elytrorum ad apicem nigris ; capite quadrato, antice bifoveolato ; prothorace transverso, angulis anticis acutis, posticis obtusis ; apice emarginato, in medio subproducto ; lateribus rotundatis, basi arcuata ; disco depresso, utrinque substriato, striis juxta basin incurvatis et conjunctis ; scutello transverso ; elytris oblongis, prothorace vix latioribus, ad apicem conjunctim rotundatis, punctato-lineatis, intervallis alternis subelvatis ; tibiis, articulis 1—2 tarsorum fuscis. Long., $3\frac{1}{2}$ mill.

Allongé, oblong, très faiblement convexe, presque glabre, roux ; tête-disque du prothorax et marges des elytres vers le sommet noirs. Tête carrée, presque mate, très finement ruguleuse sur les côtes, impressionnée en avant de chaque côté vers la base des antennes. Prothorax près opaque, à peine ponctué, de moitié plus large que long, notablement plus large que la tête, aussi large à la base, qu'au sommet ; bord antérieur échancré, un peu saillant vers la tête dans son milieu ; bords latéraux arqués, présentant leur maximum d'écartement en avant du milieu, base arquée, très légèrement sinuée vers les angles postérieurs ; angles antérieurs aigus, emoussés, postérieurs obtus emoussés ; disque deprimé ; marge antérieure faiblement relevée de chaque côté près du milieu en lobes s'arretant latéralement à une strie longitudinale très faiblement marquée sur le disque, profondement imprimée vers la base qu'elle reborde en s'infléchissant vers l'écusson. Ecusson transversal, oblong. Elytres à peine brillantes, ovales très allongés, un peu plus larges à la base que le prothorax, arrondis ensemble au sommet, présentant leur plus grande largeur vers le tiers postérieur, présentant de chaque côté vers la marge latérale un pli assez marque, ponctués striés ; intervalles alternes légèrement relevés ; strie scutellaire courte. Pattes sauf les articles 2 et 3 des tarses enfumés.

West Australia.

SYMPANOTUS AUSTRALIS, *n. sp.*

Oblonglus, subparallelus, subconvexus, piceus, setulosus ; capit˘

antice bifoveolato ; prothorace transversim subquadrato, antice angustato ; margine antice bisinuato, lateribus arcuatis, basi utrinque late emarginata ; angulis anticis et posticis rectis : disco inæquali, in longitudinem sulcato, setis piceis et flavescentibus vestito ; scutello transverso ; elytris parallelis, ad apicem conjunctim subacuminatis, punctato striatis, piceo-setosis, fasciculis flavescentibus et cinereis sparsis ; antennis pedibusque rufo-testaceis. Long., 4 mill.

Oblong, suparallele, faiblement convexe, noir de poix, garni de soies dressées, courtes. Tête transversale, arrondie en avant, impressionnée obliquement de chaque côté vers la base des antennes. Prothorax beaucoup plus large que la tête, une fois et un tiers aussi large que long, rétréci en avant ; bord antérieur saillant sur la tête, sinué de chaque côté ; bords latéraux paralleles dans la partie basilaire, arqués convergents dans la partie apicale ; base arquée dans le milieu, largement échancrée de chaque côté ; marge antérieure etroitement relevée en bourrelet ; marges latérales faiblement explanées, ciliées, marge basilaire profondement rebordée sur les côtés ; disque irregulier, revetu de soies variant du clair au brun masquant la structure du tegument sauf sur une ligne longitudinale mediane qui presente l'aspect d'un sillon. Ecusson très transversal, peu visible. Elytres deux fois et demie aussi longe que le prothorax, subparalleles, subacumines ensemble au sommet, ponctués striés ; intervalles, subconvexes garnis d'une rangée de soies dressées ; une bande suturale peu marquée, deux taches dans la région basilaire et deux bandes transversales très diffuses, la 1me vers le milieu, la 2me avant le sommet formées de touffes de poils gris ou déterminées par des soies plus claires. Pattes et antennes roux testacees.

Montagnes de Victoria.

New Australian Lepidoptera.

By Oswald B. Lower, F.E.S.

[Read May 2, 1893.]

Rhopalocera.

SATYRIDÆ.

Heteronympha paradelpha, *n. sp.*

Male and female, 54-64 mm. Head, thorax, and abdomen yellowish-brown. Palpi whitish, clothed with blackish hairs beneath, especially towards apex. Antennæ fuscous, annulated with white. Legs whitish-ochreous. Anterior tibiæ fuscous. Forewings triangular, costa gently arched, more strongly in male; hindmargin rounded, oblique, more so in male; dark-fuscous, with twelve orange spots, arranged as follows:—First, costal, elongate from base to about middle, leaving extreme costal edge fuscous; second, sphenoid, immediately above inner margin, from base to near middle, suffused with ground-colour in middle, more so in male; third, just beyond second, semiovate (irregular), touching second on lower half; fourth, just beyond third, above anal angle, irregular diamond-shaped, in male anteriorly indented in middle; fifth, immediately beneath posterior angle of first, irregular-sphenoid, contracted in middle, in male upper portion very narrow, almost, if not quite, separated by ground-colour; seventh, near apex, irregular-ovate, posteriorly obtuse; sixth, irregular diamond-shaped, midway between fifth and seventh; eighth, ninth, tenth, and eleventh form a hindmarginal band; ninth and eleventh, very small, latter obsolete in male; tenth, spherical, a black ocellus, with a minute white eye just below seventh; twelfth rounded (paler than others), below ocellus; cilia ochreous-fuscous. Hindwings with hindmargin rounded, waved; orange-yellow, markings fuscous; a curved band from middle of costa to middle of disc (in male suffusedly continued to inner margin), strongly attenuated towards costa; a transverse spot at about end of cell; two waved hindmarginal bands, confluent at apex, attenuated to anal angle, and touching curved band in centre; in male the two bands are confluent throughout, leaving four irregular spots of ground-colour. A black ocellus with minute white eye above anal angle; two minute black dots in neural spaces at apex of hindmarginal bands; a blackish line along hindmargin, surmounted by a strip of ground-colour of same width. Cilia as in forewings.

Underside.—Forewings orange-yellow, lighter towards base, markings dark-fuscous; a small spot in middle of cell, obsolete in female; a spot within and near end of cell, larger in female; a moderate band, from middle of costa to two-thirds above inner margin, angulated outwards in middle; a lunate mark beneath, in female meeting band; another band from costa near apex to near anal angle, very broad, and much paler on costa, contracted below middle, anal portion touching posterior extremity of lunate mark; a narrow hindmarginal band; a black ocellus ringed with yellow, with a minute white eye; a round yellowish spot immediately beneath. Hindwings yellowish-brown, mixed with bluish-grey; three strongly-waved dark-brown lines from costa at one-third, one-half, and five-sixths respectively, to inner margin at one-third, one-half, and anal angle; a series of three black ocelli, edged with yellow, and ringed with brown, one above anal angle (largest), two near apex, lower the smallest; two minute white spots between first and second ocelli, a double dark-brown hindmarginal line.

Between *Banksii* and *Philerope*, but quite distinct from either. Melbourne, Victoria, from Mr. F. Spry.

Heterocera.

Bombycina.

COSSIDÆ.

Cossus rhytiphorus, *n. sp.*

Male, 66-70 mm. Head, palpi, antennæ, thorax, and abdomen dark slaty-grey, palpi porrected, twice the length of eye. Antennal pectinations four. Thorax with a narrow black anterior band and two longitudinal stripes, one on each shoulder. Legs dark slaty-grey, tarsi obscurely ringed with whitish. Forewings moderate, costa evenly arched; hindmargin rounded, oblique, dark slaty-grey, with numerous black transverse strigulæ, edged with whitish or ochreous, having the appearance of raised cracked lines; five irregular, short, black streaks on costa, between base and middle, irregularly and interruptedly to or near inner margin; an irregular V-shaped black mark from costa near middle obscurely continued to inner margin near middle; five or six similar, but much more obscure, marks on costa from beyond middle to apex, leaving middle of costa with a clear space of ground-colour, except a minute dot; black markings more distinct towards anal angle, where they form four or more irregular transverse streaks; a narrow black streak from base to anal angle, cutting last-mentioned streaks more distinct posteriorly; cilia ashy-grey-whitish, darker basally. Hindwings with hindmargin rounded, slightly sinuate towards anal angle, which becomes

slightly prominent, grey-whitish, base densely haired with ashy-grey, cilia as in forewings. Underside of hindwings slightly paler than above, with well-marked fuscous reticulations, base of cilia with an ill-defined fine ochreous line.

One specimen Slape's Gully, November 9, 1892 ; another at Blackwood, South Australia, October 21, 1892 ; also from Melbourne, Victoria (Coll. Kershaw) ; and one in S.A. Museum, in poor condition. Reminds one of *Ptilomacra senex*, Walk.

Cossus (?) polygrapha, *n. sp.*

Female, 28-35 mm. Head and palpi light-fuscous, mixed with whitish and black, antennæ dark-fuscous, slenderly annulated with white, base ochreous, thorax ashy-grey-whitish, patagia with well-defined black edge. A similar band on posterior portion of thorax, divided in middle by a whitish spot. Abdomen with two basal segments ochreous grey, third somewhat rufous, rest fuscous grey, margins whitish, crests whitish. Legs light-fuscous, posterior pair darker, ringed with whitish at apex of joints. Forewings elongate oblong, costa arched at base, hindmargin almost straight, slightly oblique, light-fuscous, irrorated with round patches of white and black scales. Veins before middle outlined in blackish, a white suffusion from middle of base to before middle of wing, posteriorly bent down along vein 1 to two-thirds, thence continued suffusedly (in one specimen very indistinctly) to costa about two-thirds, suffused at anal angle ; twelve or fifteen blackish spots along costa, from each of which proceeds an interrupted blackish waved line towards inner margin ; more distinct in middle of disc, where there are some ferruginous scales suffused ; a small white spot on submedian fold, a fan-shaped patch from costa before apex to vein 1, where it is edged by a black line, and on costa with three elongate black marks. In the patch the veins are thickly outlined with white, and a few black scales at base ; cilia light-fuscous, sprinkled with blackish, at extremities of veins with elongate white streaks, continued to tips, giving the appearance of black and white lines. Hindwings fuscous at base, with ochreous hairs Cilia whitish, base ochreous tinged.

Mitcham and Parkside in May, two female specimens. Without the male it is uncertain as to genus ; perhaps a new one will be required to receive it. It hardly seems a *Cossus*, as generally understood.

ARCTIADÆ.

Termessa Lyelliana, *n. sp.*

Male and female, 26-28 mm. Head, face, and thorax, snow-white ; thorax with a broad dark-fuscous transverse median band, shoulders broadly black. Palpi and antennæ blackish. Anterior

legs dark-fuscous, middle and posterior pair ochreous-yellowish. Abdomen ochreous-yellow, anal segments beneath blackish. Forewings elongate triangular; costa gently arched, hindmargin obliquely rounded, white; markings blackish, inner margin ochreous-yellow throughout, a thick elongate streak along costa from very near base to beyond middle, posteriorly dilated; a straight slightly dentate line from basal extremity of this streak to inner margin, but not quite reaching it; a similar, but thicker line from two-thirds of costal streak to inner margin before middle, strongly curved outwards in middle; a third similar line from about four-fifths of costa to inner margin at four-fifths, strongly curved outwards in the middle; a well-defined black discal dot midway between second and third lines; costal edge above discal dot ochreous-yellow; a tolerably broad suffused hindmarginal band, from apex to anal angle, leaving an irregular rounded spot of ground-colour above middle of hindmargin; cilia blackish, with about six ochreous-white teeth at extremities of veins. Hindwings ochreous-yellow, with a blackish apical patch, continued midway along hindmargin, strongly attenuated posteriorly. Cilia ochreous-yellow, suffused with blackish at apex.

Two specimens received from Mr. G. Lyell, jun., who states that it frequents *Exocarpus cupressiformis* ("Wild Cherry-tree") in February and March, at Gisborne, Victoria. A distinct and neat species, not closely allied to any other, but approaching *T. nivosa*, Walk., by the white forewings, but immediately separable by the yellow hindwings. At first sight it is not unlike a large *Comarchis* or *Thallarcha*.

SOROCOSTIA ANISOGONA, *n. sp.*

Male, 26 mm. Head, thorax, antennæ, and palpi fuscous, minutely irrorated with whitish; palpi two and a half; thorax with a narrow anterior blackish band, indications of another in centre, transverse, and two black spots posteriorly. Legs and abdomen grey-whitish, anterior tibiæ and tarsi blackish; tarsi with obscure whitish rings. Forewings elongate triangular, costa gently arched, hindmargin obliquely rounded; dark-fuscous, minutely irrorated with whitish iridescent scales; tufts blackish anteriorly, posteriorly whitish; first tuft connected with costa by a few black scales; a well-marked dentate blackish line from one-fourth costa to one-fourth inner margin, strongly curved, and touching second tuft in middle, margined anteriorly with whitish near inner margin; a second similar line from about two-thirds costa to beyond middle of inner margin, strongly curved outwards above middle. Concavity beneath occupied by a patch of whitish scales; a rather thick, well-defined black streak from below middle of second line to first line, but not quite reaching it.

Some black scales connected with this on inner margin, and enclosing a small spot of ground-colour; a third line from before apex to anal angle, upper half indistinct, lower half posteriorly edged with whitish, with a rounded projection in middle; a hindmarginal row of elongate black dots; cilia dark-fuscous, with white teeth at extremities of veins. Hindwings and cilia fuscous, cilia with a lighter basal line.

One specimen from Blackwood, in November. The large size and well-marked lines are good characteristics.

LIPARIDÆ.

Euproctis pelodes, *n. sp.*

Male, — mm. Head, palpi, antennæ, thorax, legs, and abdomen brownish-ochreous. Antennal pectinations six. Forewings elongate triangular, costa slightly arched near base, apex rounded, hindmargin oblique, brownish-ochreous. A row of tolerably well-defined whitish spots from near anal angle to near apex, slightly angulated outwards in middle, the first spot more elongate; cilia whitish-ochreous, barred with dark-brownish-ochreous. Hindwings and cilia as in forewings, but without markings.

One specimen, Parkside (at light), in January.

Darala hæmoptera, *n. sp.*

Male, 52 mm. Head, palpi, thorax, legs, and abdomen mahogany-red. Anterior tarsi ochreous-reddish. Antennæ ochreous-yellow; pectinations eight, fuscous. Forewings triangular, costa straight, hindmargin bowed, oblique; mahogany-red, with purple-fuscous markings; an ill-defined curved band from one-third costa to one-third inner margin, anterior edge well-defined, posterior suffused; a well-defined white discal dot ringed with black; a broad, nearly straight, waved band; anterior edge from two-thirds costa to three-fifths inner margin, irregular; posterior edge from five-sixths costa to near anal angle, indented on veins, each indentation being filled up with a black dot; a moderate hindmarginal line, space anteriorly paler than rest of wing; cilia reddish-ochreous. Hindwings with hindmargin rounded, reddish-fuscous, lighter towards base; a black discal dot; a row of black dots on veins, nearly straight, from costa near apex to anal angle, edged posteriorly with a lighter band; a suffused fuscous hindmarginal band; cilia as in forewings.

Port Lincoln; one specimen (Rev. T. Blackburn).

BOMBYCIDÆ.

Bombyx zonospila, *n. sp.*

Male, 40 mm. Head, thorax, palpi, and legs pale dove-colour;

face blackish, terminal joint of palpi whitish. Abdomen blackish-fuscous. Antennæ whitish ; pectinations twelve, orange. Forewings triangular, costa straight, hindmargin bowed, oblique, slightly waved ; pale dove-colour ; a row of irregular black dots, edged *posteriorly* with orange, from near middle of costa to about one-third inner margin ; a similar row on veins from two-thirds costa to two-thirds inner margin, edged *anteriorly* with orange ; cilia pale dove-colour, with a darker hindmarginal line. Hindwings slightly darker than forewings. Cilia as in forewings, with a whitish parting line at base.

Eucla ; one specimen, in June.

Bombyx galactodes, *n. sp.*

Female, 58-60 mm. Head, thorax, and abdomen fuscous ; lower part of face ochreous. Abdominal segments paler, thorax mixed with whitish. Antennæ fuscous ; pectinations four, orange. Legs dark-fuscous, tarsi obscurely ringed with whitish. Forewings elongate triangular, costa straight, arched towards apex; hindmargin slightly waved oblique ; fuscous, irrorated with white, with darker fuscous markings ; three moderate bands, first from one-fourth costa to one-fourth inner margin, slightly curved outwards ; second from middle of costa to three-fifths inner margin, with a projection outwards above middle, angulated inwards below middle, a white discal dot edged with dark-fuscous midway between the two lines ; third line from four-fifths costa to anal angle, sharply indented inwards beneath costa, thence outwards, and continued strongly dentate to anal angle ; space between second and third lines *milky-white*, marked only by brown veins ; a suffused milky-white patch reaching costa near apex, and continued along posterior edge of third line ; cilia fuscous, tips whitish. Hindwings milky-white, base densely clothed with brownish hairs ; cilia as in forewings.

Duaringa, Queensland, two specimens, from Mr. G. Barnard, who informs me that they are attached to *Casuarina*, and form hard woody cocoons on the outside of the bark. In these respects they agree exactly with *vitulina*, Don, and *mioleuca*, Meyr., the present species being intermediate. In Meyrick's original description of *mioleuca* (Tr. Roy. Soc. S.A., XIV., p. 190, 1891) it is stated that the specimens were taken at "Mount Lofty by Mr. E. Guest, who has taken others." This is erroneous, as Guest never saw the insects until I gave him a pair. They are very local, and can *only* be obtained by breeding. Even then they are difficult to get in good condition, as they usually emerge (60 per cent.) between midnight and six o'clock in the morning. Parkside and Knightsbridge are the only places I have found them.

Noctuina.

APAMIDÆ.

DASYGASTER MUNDOIDES, *n. sp.*

Male and female, 38-42 mm. Head, palpi, and thorax fuscous-reddish, sprinkled with ashy-whitish. Antennæ whitish, annulated with black; base snow-white. Ciliation one. Abdomen greyish-ochreous, anal-tuft reddish. Legs dark-fuscous, mixed with reddish and clothed with long whitish hairs; tibiæ and tarsi fuscous-reddish, with suffused whitish apical rings. Forewings moderate, posteriorly dilated; costa gently arched, hindmargin nearly straight, oblique; brownish, minutely and closely irrorated with black and white scales; veins outlined with reddish towards hindmargin, in middle somewhat with blackish, a strongly angulated reddish-fuscous indistinct line from costa at one-fourth to inner margin at one-third, a paler ovate spot lying longitudinally in disc above middle at one-third; an irregular 8-shaped spot immediately beyond, not indented anteriorly; an irregular outward-curved dentate line from about two-thirds of costa to two-thirds innermargin, with a projection inwards below middle to beneath middle of 8-shaped spot; a row of suffused black hindmarginal spots; cilia coppery-fuscous, with two waved fuscous lines. Hindwings iridescent-whitish, a suffused blackish hindmarginal band broadest at apex, and gradually narrowing to a point towards anal angle; cilia snow-white, with a few black scales at apex (variable). In the female the markings of forewings are almost obliterated in the general ground-colour, and the hindwings almost wholly suffused with fuscous.

Blackwood, Parkside, South Australia; and Melbourne, Victoria. At first sight very like *Agrotis munda*, Walk., but the antennæ afford a distinguishing test.

NOCTUIDÆ.

ORTHOSIA CREMNODES, *n. sp.*

Male and female, 35-38 mm. Head blackish, minutely irrorated with grey; palpi fuscous, mixed with black and white, internally paler. Antennæ rufous beneath, fuscous above. Thorax blackish, with a distinct narrow whitish anterior band, cleft in middle. Abdomen whitish-fuscous. Legs reddish-fuscous, tibiæ and tarsi with indistinct white bands. Forewings moderate; costa straight, hindmargin somewhat waved, rounded; blackish or black, minutely irrorated with grey; veins indistinctly outlined in black; a yellow dot in disc at end of cell; a transverse row of black dots beyond; a narrow pale-fuscous hindmarginal line; cilia dark-fuscous, basal-half black. Hindwings iridescent-whitish; a suffused blackish apical patch, abruptly

narrowed and continued interruptedly to anal angle, more prominent at extremities of veins; a narrow blackish hindmarginal line; cilia shining white, with a coppery tinge at apex, and a suffused fuscous dividing line. Underside of forewings fuscous; a suffused white streak along costa from base to five-sixths; a tuft of yellow hairs near base. Hindwings iridescent-whitish, costa sprinkled with blackish, an irregular roundish blackish patch at apex; a transverse discal spot, scarcely perceptible above.

Parkside, S.A., in October (at light).

ORTHOSIA MESOMBRA, *n. sp.*

Male and female, 31-35 mm. Head, thorax, and palpi greyish-ochreous, palpi whitish beneath, with a blackish median band, terminal joint whitish. Thorax with a narrow blackish band beyond middle. Antennæ greyish-ochreous, reddish beneath. Ciliations one-half. Abdomen and legs grey-whitish, spotted with blackish, tarsi and tibiæ with obscure whitish rings. Forewings moderate, posteriorly dilated; costa nearly straight, hindmargin rounded, oblique; greyish-ochreous in male, in female wholly suffused with fuscous; an orange-red spot close to base; a short irregular blackish line from costa to this spot; an indistinct angulated fuscous line from one-fourth costa to near middle of inner margin; a wedge-shaped dark fuscous streak in middle of disc, from two-fifths to five-sixths, dilated and touching costa, terminated by an irregular line from costa at five-sixths; a small round reddish spot at beginning, and larger somewhat lunate spot in middle of the wedge-shaped streak; a fuscous dentate line from costa immediately above lunate spot, and passing round it to three-fourths inner margin, between this line and termination of wedge-shaped spot, the wing is reddish-tinged in male; an interrupted waved hindmarginal line; cilia-greyish ochreous. Hindwings iridescent whitish, in female suffused with fuscous at apex and along hindmargin; an indistinct curved series of elongate marks, placed on veins, in middle of wing; an obscure fuscous discal spot, both markings more noticeable on underside.

A pretty species, not recalling any other; the sexes are somewhat dissimilar, but it cannot be well mistaken.

Parkside (at light) in October; also from Blackwood, S.A.

PSEUDOPANTHERA HABROCOSMA, *n. sp.*

Male, 35-38 mm. Head blackish-fuscous, palpi and antennæ reddish-fuscous, anterior legs dark-fuscous, posterior and middle pairs whitish-ocherous, thorax reddish-fuscous, abdomen orange. Forewings elongate, costa strongly arched at base, apex acute, hindmargin sinuate beneath apex, thence strongly bowed, oblique; fuscous-reddish, irrorated with ochreous and lead-coloured scales,

veins marked with darker posteriorly; a short thick streak from one-sixth costa outwardly oblique to middle of wing, edged anteriorly by a more or less whitish suffusion, posteriorly by a broad patch of whitish-yellow, in one specimen suffused with brown, an elongate patch of lead-coloured scales in middle of wing, just beyond, sometimes obscurely continued towards hindmargin; an obscure irregular lead-coloured thick streak from beneath apex to anal angle, obscurely edged with whitish; an obscure oblique white apical dash, sharply margined posteriorly with dark-brown; an interrupted black hindmarginal line, preceded by a whitish irroration; cilia greyish-fuscous, with a darker median line. Hindwings with hindmargin somewhat prominent in middle, slightly sinuate above and below, bright-orange; an elongate black apical patch; cilia yellow.

A beautiful species, bearing a superficial resemblance to some forms of *Selidosemidæ*. Two specimens beaten from *Hakea rugosa*, at Blackwood, February to April. It is an exceedingly difficult species to net, and hiding as it does amongst the sharp spiny branches of the above-mentioned plant usually escapes through the net getting entangled.

Geometrina.

MONOCTENIADÆ.

Taxeotis gonosemela, *n. sp.*

Male, 28 mm. Head, palpi, antennæ, thorax, abdomen, and legs greyish-ochreous; anterior legs infuscated. Forewings triangular, hindmargin obliquely rounded; greyish-ochreous, minutely irrorated with black scales; costa strigulated throughout with blackish; an indistinct blackish angulated line from about one-third costa to below middle of disc, thence strongly oblique to one-sixth inner margin; a more distinct similar line from immediately before apex to about two-thirds inner margin, strongly angulated inwards above and below middle; a small black discal dot in middle of wing; a hindmarginal row of black dots; cilia ochreous-grey. Hindwings whitish, speckled with blackish; an obscure black discal dot; a very obscure row of minute black dots, from two-thirds costa to two-thirds inner margin (both plainly visible on underside); a blackish hindmarginal line interrupted on veins; cilia as in forewings.

One specimen, Parkside, at a street lamp.

Darantasia pachygramma, *n. sp.*

Male, 18 mm. Head whitish, thorax, abdomen, legs, and palpi pale stone-colour. Antennæ yellowish-tinged. Forewings triangular, short; stone-colour, minutely and sparsely irrorated

with black; costa blackish towards base; a very thick black streak from near base of inner margin to beyond middle of disc curved upwards and attenuated at both extremities, posteriorly edged with paler; a similar black streak from apex to anal angle, attenuated at apex, edged as other; a hindmarginal row of small black dots. Hindwings with colour as in forewings; a very indistinct line from two-thirds inner margin going towards costa, but not reaching it.

Eucla, West Australia. One specimen in June. An abnormal-looking species, more like a small *Dichromodes* in appearance.

NEARCHA PSEUDOPHAES, *n. sp.*

Male, 32 mm. Head, thorax, legs, and abdomen greyish-ochreous; palpi two and a-half, black, at base white. Antennæ whitish, pectinations twelve. Forewings elongate; costa arched at base, slightly sinuate beyond middle, hindmargin nearly straight, slightly oblique; ochreous-grey, with scattered fine dark-fuscous scales; a transverse straight row of three black dots, from one-third costa to above middle of wing, edged anteriorly with a whitish-ochreous streak; a row of black dots from costa at three-fourths to inner margin at two-thirds, angulated inwards below middle; each spot is edged posteriorly with whitish, and beyond this a pale reddish-ochreous suffusion throughout; a large black discal dot, white centred, midway between the two rows of dots; a row of black dots at extremities of veins; cilia ochreous-grey. Hindwings with hindmargin nearly straight; whitish-grey, fuscous-tinged; an indistinct dark-fuscous discal dot; a hindmarginal row of black dots; cilia as in forewings. Hindwings beneath without tufts, but with a well-defined black discal dot.

Near *D. curtaria*, Gn., but differs in black shorter palpi, &c. Two specimens at Blackwood, S.A.

DICHROMODES STROPHIODES, *n. sp.*

Male and female, 22-25 mm. Head and thorax dark ashy grey, thorax with a tranverse black median band; palpi three and a-quarter, black. Antennæ, abdomen, and legs dark fuscous. Abdomen with yellowish segmental margins, tibiæ ringed with white, antennal ciliations three and a-half. Forewings triangular; costa straight, arched at base; hindmargin slightly waved, bowed, oblique; ashy-grey; a suffused blackish triangular spot midway between base and first line; first line straight from one-fourth costa to one-fourth inner margin, suffusedly edged on each side with pale-ochreous; second line straight from costa one-third to inner margin before middle; third line from two-thirds costa to two-thirds inner margin, with a strong projection outwards in middle,

sinuate above and below, more strongly below; space between second and third lines blackish, with a blacker transverse discal dot, a narrow line near and parallel to third, on projection suffused with ochreous; a broad blackish undulating line from costa near apex to anal angle, edged posteriorly throughout with whitish, a suffused whitish apical dash; a waved black hindmarginal line; cilia fuscous, barred with whitish-fuscous, basal-half dark fuscous, base sprinkled with white. Hindwings with hindmargin waved, rounded; slaty fuscous; three short, whitish, dark margined streaks on inner margin above anal angle, upper one continued suffusedly across wing to costa at two-thirds, an indistinct blackish discal dot; cilia light-fuscous, with a darker median line, base whitish.

Very near *D. triparata*, Walk., but a stouter built insect, broader winged, hindmargin more bowed, &c. The descriptions of this species and "*triparata*" read somewhat alike, but the difference in the insects when compared is well marked. Blackwood and Highbury, S.A., not uncommon in November. Mr. Meyrick has specimens from the "Grampians," Victoria.

GEOMETRIDÆ.

IODIS RHYTIPHORUS, *n. sp.*

Female, 36 mm. Head, fillet, palpi, antennæ, thorax, and abdomen whitish-ochreous. Palpi rather short, terminal portion of antennæ reddish-fuscous, patagia broadly green. Abdomen above sprinkled with green near base. Legs pale reddish-fuscous, coxæ white. Forewings elongate triangular; costa nearly straight, rounded towards apex.; hindmargin nearly straight, slightly rounded, 3 and 4 from a point; light bluish-green, with numerous minute transverse whitish strigula; costa whitish-ochreous throughout, more broadly in middle; lines white narrow straight, tolerably well-defined, first from beneath costa at one-sixth to inner margin at one-fourth, second from beyond middle of costa to two-thirds of inner margin, a transverse darker green discal dot. Cilia pale whitish-ochreous, tips fuscous. Hindwings with hindmargin somewhat rounded obtusely-bent on vein 4, three- and four-stalked, colour and cilia as in forewings, lines as in forewings running continuously with them, but second more irregular and scalloped twice between veins 1 and 3, first line irregular and bent inwards from vein 3 to near inner margin.

Palmerston, Northern Territory, one specimen. Nearest to *I. albicosta*, Walk., but differs markedly in position and shape of lines, otherwise superficially similar.

ACIDALIA DIDYMOSEMA, *n. sp.*

Male, 23 mm. Head, palpi, thorax, and abdomen dark-fuscous. Antennæ whitish; ciliations two. Legs fuscous

posterior pair whitish. Forewings elongate triangular, costa very slightly arched; hindmargin obliquely rounded; light fuscous-ochreous-tinged; a well-developed nearly straight denticulate dark-fuscous line from beyond one-third of costa to middle of inner margin; a similar line, more oblique, from costa beyond two-thirds to inner margin at two-thirds curved inwards on lower half, a well-developed transverse discal spot midway between these two lines, a blackish hindmarginal line, somewhat interrupted by veins. Cilia dark-fuscous. Hindwings with hindmargin rounded; colour, lines, and cilia as in forewings.

The present species could easily be mistaken for *rubraria*, Dbld., to which it bears a close superficial resemblance, but differs considerably in position of lines and discal dot, and especially by the shorter antennal ciliations. One specimen at Glen Osmond, 10th October.

Sterrha aglaodesma, *n. sp.*

Male, — mm. Head, palpi, antennæ, thorax, and legs whitish-ochreous. Abdomen whitish. Forewings triangular, costa arched at base; hindmargin nearly straight, oblique; pale-ochreous; a straight fuscous line from one-fourth costa to one-third inner margin; a similar, but broader, line immediately beyond; a dark-fuscous waved line from two-thirds costa to two-thirds inner margin, with a moderate indentation above middle; space between last two lines filled with white; a narrow dentate, fuscous line from before apex to anal angle, edged anteriorly with a darker fuscous suffusion, posteriorly by a fine *distinct* white line; a hindmarginal row of obscure white dots, veins towards hindmargin obscurely outlined with white; cilia ochreous, with white streaks at termination of veins. Hindwings whitish; an indistinct suffused fuscous line from anal angle to near apex; cilia white.

Eucla, Western Australia; one specimen, in June. This genus has not previously been recorded in Australia.

Pseudoterpna argyraspis, *n. sp.*

Male, 36 mm. Head, thorax, and palpi whitish; posterior portion of thorax with two longitudinal black streaks meeting anteriorly; abdomen fuscous, with blackish tufts; legs whitish, ringed with black. Forewings elongate triangular, hindmargin rounded, slightly waved, oblique; silver-grey; all veins tending to be outlined with black; a suffused triangular patch on middle of costa, costal edge from patch to base broadly and suffusedly irrorated with blackish; a sharply-defined black streak from base of wing along fold to about middle; an indistinct row of elongate streaks between veins from four-fifths costa to anal angle; a black hindmarginal line; cilia whitish, barred with

fuscous. Hindwings with hindmargin rounded, slightly waved, whitish, becoming white towards inner margin and base; a broad suffused blackish hindmarginal band, a blackish hindmarginal line; cilia as in forewings.

One specimen, bred in February from *Eucalyptus rostrata;* forms a rough silky cocoon beneath the bark; Blackwood, S.A.

SELIDOSEMIDÆ.

Diastictis goniota, *n. sp.*

Female, 28 mm. Head, palpi, antennæ, and thorax ochreous-fuscous, antennæ spotted with black. Abdomen and legs greyish, minutely irrorated with dark fuscous. Forewings elongate, costa strongly arched near base; hindmargin strongly angulated in middle, sinuate above and less below this angulation; light ochreous-fuscous; a black dot in disc about middle; a dark-fuscous line from costa at five-sixths to four-fifths inner margin, slightly angulated near costa, and margined rather broadly on each side with darker ground-colour; a hindmarginal row of indistinct black dots; cilia ochreous-fuscous, with a whitish basal line. Hindwings with hindmargin irregularly waved, whitish-grey, suffusedly irrorated with fuscous, except towards base; a minute black dot in middle of wing; an indistinct waved line from costa near apex to about two-thirds inner margin; cilia as in forewings, but slightly paler.

One specimen, Hallett's Cove, S.A., in November; larva feeding on *Muehlenbeckia adpressa.*

Diastictis odontias, *n. sp.*

Male, 36 mm. Head, palpi, and legs ochreous; posterior femora whitish; antennæ white-spotted with fuscous; pectinations six, fuscous-tinged, apical-fifth simple; thorax ochreous-grey. Abdomen whitish-ochreous, with a double series of dorsal dots towards base. Forewings triangular; costa straight; hindmargin rounded, oblique, pale dove-colour; with numerous transverse ferruginous strigulae; costal edge yellowish-ochreous throughout, strigulated with blackish; a narrow ferruginous line from one-third costa to about one-third inner margin, strongly curved outwards near costa; a transverse black discal dot; a thick, straight, ferruginous line from about two-thirds costa to two-thirds inner margin, edged beyond throughout by a waved ferruginous line, included space paler than rest of ground-colour; a thick, waved, interrupted ferruginous line from five-sixths costa to anal angle, lower-half almost lost in general ground-colour; a waved hindmarginal line; cilia grey-whitish. Hindwings with hindmargin very strongly dentate; colour, discal dot, and markings as in forewings, but apex and part of hindmargin marked with

ochreous-orange and brown ; hindmarginal line black, distinct ; cilia white, tipped with black and ochreous at extremities of veins.

One specimen from Port Darwin. In appearance resembling somewhat a *Hypochroma*.

Diastictis (Selidosema) heterogyna, *n. sp.*

Male and female, 38-43 mm. Head, palpi, antennæ, thorax, and abdomen fuscous, abdominal segments blackish. Antennæ whitish-ochreous at base, pectinations seven, apical fifth filiform ; face black, with a whitish-ochreous median bar. Legs ochreous-whitish, irrorated with fuscous. Forewings elongate triangular, costa almost straight, hindmargin dentate, more strongly in female, rounded, oblique ; in female slaty grey, in male ochreous-fuscous; a short black oblique line from one-sixth inner margin obliquely outwards ; a black line from one-third inner margin direct to, but interrupted before apex ; in male ground-colour above this line is whitish-ochreous, below fuscous mixed with ferruginous and black, separation sharply defined ; a black line, tending to be double at origin, on posterior edge throughout, with a brown shade ; a short oblique dash on costa before apex, not in male, beneath which is a small black dot ; a thick black waved line from three-fourths inner margin to hindmargin below apex, thicker at extremities, and more distinct in female, irregularly edged posteriorly by a fine white line ; a fine black waved hindmarginal line ; cilia grey-whitish, barred with fuscous at extremities of veins ; a whitish basal line. Hindwings with hindmargin rounded, dentate, more strongly in female, colour and markings as in forewings ; a transverse black discal dot ; in the male, base and apex are suffusedly irrorated with fuscous, at extremity of suffusion is a transverse black linear discal dot ; hindmarginal line and cilia as in forewings.

Two examples, Parkside, at street lamps in May. This species is easily recognised by the well-defined longitudinal black line and curious division of colour of forewings. It is near *excursaria*, Gn.

Diastictis (Selidosema) chionomera, *n. sp.*

Male, 41 mm. Head, palpi, thorax, and abdomen brownish-ochreous ; face blackish, lower-third white ; thorax with two straight transverse dark-brown bands. Legs fuscous. Antennæ fuscous, pectinations six. Forewings triangular ; costa straight, hindmargin hardly waved, obliquely bowed ; light-fuscous, irrorated with ochreous and whitish ; costa strigulated with fuscous ; a curved oblique blackish line from one-third costa to one-sixth inner margin ; a thick blackish streak or shade, thicker on lower-half, suffusedly continued to hindmargin below apex

from one-third inner margin, posterior edged with yellowish ; a transverse blackish discal dot before this ; a rather thick suffused line from above anal angle to apex of shade ; a short black apical dash ; an interrupted waved, blackish hindmarginal line ; cilia grey-whitish, fuscous-tinged. Hindwings with hindmargin rounded, waved, colour as in forewings ; a white basal patch, containing a short black mark in middle ; a straight blackish shade from one-third inner margin to one-third costa ; a well-defined blackish lunate discal mark ; an interrupted row of black dots from two-thirds inner margin to four-fifths costa, sometimes connected with a fine black line ; a rather thick ochreous shade beyond and parallel ; a blackish shade from above anal angle to costa before apex, where it is broader, followed by a whitish subterminal line ; hindmarginal line and cilia as in forewings.

Underside of forewings dull ochreous-white, a well-defined blackish hindmarginal band from vein 2 to apex, broader at apex ; a large blackish discal dot in middle of wing ; hindwings as forewings, but discal dot much smaller.

One specimen at Burnside. Allied to *D. lyciaria*, Gn., but smaller ; differs especially in underside. It also has considerable superficial resemblance to large specimens of *D. excursaria*, Gn. The snow-white basal patch is a good and distinct character.

Diastictis (Selidosema) mesombra, *n. sp.*

Male, 38 mm. Head, face, palpi, and thorax yellowish-clay colour, thorax with a blackish suffused transverse median band. Abdomen and legs greyish. Antennæ fuscous, pectinations nine, apical-sixth simple. Forewings triangular, costa nearly straight, hindmargin almost straight, obliquely waved ; pale-ochreous-yellowish, suffused with fuscous, and blackish towards costa and base of inner margin ; an undulating brownish line from about one-third costa to one-third inner margin, marked on costa with black, and more strongly so on inner margin ; a similar more dentate line from middle of wing to middle of costa, with a strong projection outwards in middle, similarly marked on costa and inner margin, space between these lines marked with blackish on inner margin ; a black mark on costa at three-fourths, with a row of three or four black dots beneath ; a blackish subterminal shade tending to form into spots from costa near apex to anal angle, margined posteriorly with an interrupted whitish line ; a small suffused white mark between veins 7 and 8, near hindmargin, and just before shade ; an interrupted hindmarginal blackish line ; cilia fuscous, obscurely barred with white. Hindwings as forewings ; hindmarginal line and cilia as in forewings.

One specimen Fernshaw, Victoria. Somewhat allied to the preceding.

Diastictis (Selidosema) cremnodes, *n. sp.*

Female, 39 mm. Head, palpi, antennæ, thorax, and abdomen dark-fuscous, lower half of face with an indistinct median bar. Legs greyish, posterior and middle pair suffused above with fuscous. Forewings triangular; hindmargin strongly dentate, rounded, oblique; greyish-ochreous, densely strigulated with black, appearing almost black; three very indistinct lines, blacker, outwards curved; first from one-third of costa to one-third inner margin; second from middle of costa to beyond middle inner margin, passing through a black discal dot; third from three-fourths costa to anal angle; a waved black hindmarginal line; cilia whitish, obscurely barred with black. Hindwings with hindmargin strongly dentate, colour as forewings, a black interrupted line from costa near apex to anal angle, parallel to hindmargin; cilia as in forewings.

One specimen, Blackwood, in May. Nearest to *suasaria*, Gn., but larger and stouter built. The specimen before me not being in the best of condition, the description is necessarily to some extent defective.

Amelora idiomorpha, *n. sp.*

Female, 30 mm. Head, palpi, antennæ, thorax, abdomen and legs whitish-grey, sparsely sprinkled with black scales. Abdominal segments slightly ochreous-tinged. Forewings elongate triangular; costa straight, apex pointed, hindmargin obliquely rounded; grey-whitish, irrorated with light-fuscous and minute black scales; costal edge darker throughout; a narrow blackish waved shade from apex to below middle of disc above inner margin, bordered beneath throughout with a distinct narrow whitish shade; cilia fuscous, darker at tips. Hindwings whitish; cilia grey.

One fine specimen, Parkside (at a street lamp) in April. Very dissimilar from all the species described from Australia.

Chlenias melanostrepta, *n. sp.*

Male, 35 mm. Head, palpi, thorax, and legs ashy-grey-whitish, face moderately rounded, without projection, crest of thorax large and well-developed, anterior edge with an interrupted black line. Antennæ white, pectinations six, ochreous-tinged, abdomen whitish-ochreous, becoming ochreous on the three basal segments. Forewings elongate, narrow; costa gently arched; apex round-pointed; hindmargin obliquely rounded, ashy-grey-whitish; a black line from one-sixth costa obliquely outwards to before middle; a longitudinal black streak from base below middle to anal angle, attenuated anteriorly, and with a short angular projection upwards at origin, margined through-

out with a fine white line ; veins tending to be outlined with black, especially towards hindmargin, where they are margined beneath with fine white lines ; an interrupted black hindmarginal line ; cilia grey-whitish. Hindwings with hindmargin rounded, opal white ; hindmarginal line and cilia as in forewings.

One specimen (at light), at Blackwood, S.A., in May. Narrower-winged than *arietaria*, Gn., to which it seems allied, also without frontal projection. The black longitudinal streak distinguishes it at once from the other species.

Chlenias pachymela, *n. sp.*

Female, 50 mm. Head and thorax ashy-fuscous ; crest blackish in front, whitish behind. Antennæ whitish. Abdomen ochreous-grey, beneath silvery-white. Legs fuscous, tarsi suffusedly banded with white. Forewings elongate, costa gently arched, hindmargin slightly waved ; grey, suffusedly irrorated with whitish, and a few fuscous scales ; lines rather obscure, first from one-third of costa to one-third of inner margin, slightly curved outwards, second from about two-thirds of costa to beyond middle of inner margin, a broad blackish suffused streak from base of costa to apex, leaving costal edge of ground-colour for its own width ; an indistinct whitish dentate subterminal line ; a blackish hindmarginal line ; cilia greyish. Hindwings with hindmargin irregularly waved, apex and anal angle rather prominent ; grey-whitish, darker posteriorly ; a suffused fuscous discal dot, hindmarginal line and cilia as in forewings.

Immediately known by the broad, blackish longitudinal streak. One specimen from Melbourne, Victoria.

Chlenias gonosema, *n. sp.*

Male, 36 mm. Head palpi, thorax and legs fuscous, face rounded, rather prominent. Antennæ pale ochreous, pectinations five. Abdomen grey, yellowish-tinged. Forewings elongate triangular, costa nearly straight, rounded at apex, hindmargin hardly waved oblique ; light fuscous, mixed with dark fuscous, whitish and ochreous ; veins more or less marked with whitish ; interneural spaces blackish towards hindmargin ; lines dentate; dark-fuscous ; first from one-fourth of costa to one-third of inner margin, tolerably thick throughout, well-defined on costa ; second from two-thirds of costa to beyond middle of inner margin, with a strong concavity above middle ; a suffused dentate whitish subterminal line ; a black hindmarginal line, interrupted by the whitish streaks on veins ; cilia greyish fuscous. Hindwings with hindmargin sinuate-rounded ; grey whitish, posteriorly fuscous tinged ; cilia whitish.

Allied mostly to *arietaria*, Gn., but distinguished from it by the absence of the horny projection on forehead, antennal pectinations, narrower forewings, and other details. One specimen from Toorak, Victoria.

CHLENIAS (?) RHYNCOPHORA, *n. sp.*

Female, 42 mm. Head, palpi, antennæ, thorax, abdomen, and legs ashy-grey, minutely irrorated with black, palpi very long, nearly four; thorax with a black longitudinal streak throughout. Forewings elongate, costa arched, hindmargin obliquely rounded; ashy-grey whitish, minutely irrorated with blackish; a short black longitudinal streak in middle of wing, another more distinct beneath and before it; indications of a line from costa at two-thirds towards inner margin; a strongly dentate line from apex to anal angle, obscurely edged posteriorly with whitish; a black hindmarginal line; cilia ochreous-fuscous, tips whitish. Hindwings grey-whitish, darker posteriorly; an obscure black dot at end of cell; cilia as in forewings.

Blackwood, S.A., one specimen, in August. An abnormal-looking species, not a true *Chlenias*, but in the absence of the male I place it here provisionally. Most probably a new genus will be required to receive it.

SMYRIODES HETEROCHAES, *n. sp.*

Male, 42 mm. Head, palpi, legs, abdomen, and thorax slaty-grey, thorax with a black anterior band immediately behind crest, tarsi ringed with whitish. Antennæ whitish, pectinations six, reddish-tinged. Forewings elongate, costa straight, hindmargin bowed, strongly dentate, oblique; slaty-grey; an outwards angulated black line at base; a black line from one-fourth costa to before middle of inner margin, angulated outwards in middle, space between the two lines more or less filled with ochreous, sometimes entirely suffused with ground-colour; a short oblique black streak on costa before middle; a black irregular line from beyond middle of costa to inner margin at two-thirds, angulated outwards above middle; a broad ochreous patch beyond, from costa to inner margin, containing three sharply-defined longitudinal black streaks, one above and two below middle, sometimes suffused with ground-colour; a strongly waved well-defined black hindmarginal line; cilia ashy-fuscous, with a whitish line at base, and obscurely barred with blackish. Hindwings with hindmargin subdentate; dark-fuscous, lighter towards base; an obscure black dot in middle of wing; a zigzag line from three-fourths of costa to anal angle; cilia whitish, with a greyish median line.

Quite distinct from the other two known species; two specimens at Blackwood, beaten from *Eucalyptus rostrata*, in August.

Smyriodes carburaria, *Gn.*

Chlenias carburaria, Gn., X., 238 ; Meyr., Proc. Linn. Soc. N.S.W., VI., 666 (1891).

Male, 42-45 mm. Head and thorax dark cinnamon-brown. Thorax with a transverse anterior band of two longitudinal black lines meeting anteriorly, crest of thorax well developed, blackish. Antennal pectinations six. Abdomen greyish-fuscous, segments faintly ochreous-tinged. Legs dark-fuscous, femora densely hairy, tarsi ringed with whitish at apex of joints. Forewings elongate, dilated posteriorly ; costa arched at base, thence straight ; apex pointed, hindmargin strongly dentate, bowed, oblique ; dark cinnamon-brown ; two black lines, first, twice strongly and sharply angulated outwards with indications of a third angulation on inner margin, first from costa at one-third to inner margin at one-third : second, strongly dentate from costa at two-thirds to inner margin at two-thirds ; an indistinct row of elongate spots from costa near apex to anal angle, between veins; space between second line and spots much paler than ground-colour, in one specimen the whole area beyond the second line is of this pale colour; a black dentate hindmarginal line, interrupted at extremities of veins ; veins tending to be outlined with dark-fuscous ; cilia dark-fuscous, tips whitish. Hindwings with hindmargin rounded, strongly dentate ; reddish-fuscous, basal-half grey-whitish ; a black discal dot ; a very obscure dentate line from two-thirds of costa to two-thirds of inner margin, indicating a continuation of second line of forewings ; hindmarginal line and cilia as in forewings.

Two specimens (at light) in May at Blackwood. As Mr. Meyrick had not seen this species until I sent it him, I am at his suggestion re-describing and referring it to the proper genus.

Pyralidina.

PYRALIDIDÆ.

Hednotodes callichroa, *n. sp.*

25 mm. Head, palpi, and abdomen yellow, abdominal segments fuscous, tip of second and tip of terminal joint of palpi fuscous, face and thorax white, thorax with a dark fuscous spot on each shoulder, and two broad blackish transverse bands placed anteriorly and posteriorly. Legs ochreous-whitish, anterior tibiæ and tarsi infuscated with white apical rings. Forewings moderate, dilated, hindmargin almost straight ; snow-white, with dark fuscous markings ; a narrow streak along costa throughout, a thick straight fascia near base ; a similar from one-third costa to one-third inner margin, slightly waved ; a thicker irregular fascia from three-fourths costa to about

two-thirds inner margin, strongly angulated outwards below middle and emitting two teeth so as to touch hindmarginal fascia; a thick hindmarginal fascia strongly curved inwards above anal angle; a hindmarginal row of white lunules; cilia whitish. Hindwings orange; a broad dark fuscous hindmarginal band; broadest at apex, obsolete on lower-half of hindmargin; cilia orange, along band fuscous.

Mr. Meyrick, to whom I submitted this specimen, informs me that it is referable to this family and is a very abnormal species; it is very handsome and somewhat resembles a *Hednota*. One specimen from Arthurton, Yorke Peninsula, in September.

BOTYDIDÆ.

Sedenia erythrura, *n. sp.*

Female, 28 mm. Head, palpi, antennæ, thorax, and abdomen whitish-ochreous, reddish-tinged, palpi whiter beneath. Anterior legs fuscous (others broken). Forewings elongate, posteriorly dilated; costa slightly sinuate beyond middle; hindmargin rounded, oblique, whitish-ochreous, reddish-tinged with darker reddish markings; a thick suffused streak along costa from base to apex, leaving extreme costal edge ochreous-whitish; a rather large discal dot beyond middle, indistinctly centred with white; a streak from five-sixths costa to anal angle, slightly curved inwards; a small patch at anal angle touching this streak; a moderate hindmarginal fascia from apex to anal angle, enclosing a well-defined streak of ground-colour between this and preceding line; cilia ochreous-whitish, towards base tinged with reddish, and mixed with blackish towards tips. Hindwings ochreous-whitish, reddish-tinged; a suffused reddish hindmarginal line; cilia as in forewings, but becoming paler towards anal angle. The markings on the posterior portion of wing being in part obliterated, the description may need expansion.

One specimen, Belair, December 28, 1892.

SCOPARIADÆ.

Scoparia leucomela, *n. sp.*

Male and female, 22-25 mm. Head, palpi, thorax, antennæ, and legs fuscous; legs suffusedly irrorated with, and posterior pair wholly, white; abdomen dark-grey, basal segment orange. Forewings elongate, posteriorly dilated, costa nearly straight, hindmargin obliquely rounded, silver-grey, costal edge very narrowly whitish throughout; a blackish longitudinal line above middle, from base to three-fourths, where it is lost in the ground-colour; all veins tending to be outlined with black, interspaces filled with white, giving the wing the appearance of alternate

black and white lines ; a fine black line along inner margin from middle to anal angle ; cilia ashy-grey-white, mixed with black. Hindwings iridescent-grey ; cilia iridescent white, with a dark fuscous basal line.

One specimen on *Eucalyptus* sp. ("Stringybark"), the bark of which is similar in colour to the insect. April 3, 1893, at Blackwood, S.A, ; also one specimen, Eucla, W.A., in May, 1892. It is an exceedingly neat-looking insect.

CRAMBIDÆ.

Hednota crypsichroa, *n. sp.*

Male and female, 24-25 mm. Head, palpi, and thorax whitish-ochreous, fuscous-tinged, palpi nearly three times as long as head, fuscous-tinged beneath. Abdomen ochreous, sometimes fuscous-tinged. Thorax with a suffused blackish mark on each side, legs whitish, fuscous-tinged. Forewings, moderately dilated, hindmargin slightly rounded oblique ; varying from ochreous-white to fuscous ; a suffused blackish streak along fold almost from base to anal angle, sometimes absent or interrupted posteriorly ; a transverse elongate discal spot, outlined with blackish, beyond middle, generally suffusedly margined on either side with fuscous patches ; a row of semi-confluent blackish spots from just above anal angle to near apex, ending in a suffused fuscous triangular patch on costa, which contains a short streak of white ; an indistinct row of elongate spots on veins along hindmargin ; cilia whitish, with three lines of dark-fuscous and a narrow basal line edged with dull-leaden. Hindwings greyish ; cilia pale-greyish, with a darker line near base.

Blackwood, Parkside, and Belair, usually at light, in March and April. An obscure though distinct species.

PHYCITIDÆ.

Lasiosticha microcosma, *n. sp.*

Male, 13 mm. Head, palpi, antennæ, thorax, abdomen, and legs fuscous, irrorated with whitish, terminal joint of palpi black, anterior tarsi suffusedly irrorated with white, anal tuft ochreous-yellow. Forewings triangular, costa gently arched, hindmargin hardly rounded oblique ; dark fuscous-reddish ; a black streak at base, suffused on inner margin ; a thick black line slightly curved from one-third to middle of inner margin, edged anteriorly with a line of metallic-leaden scales, between basal line and this there is a large patch of leaden-metallic scales, posteriorly edged by a line of ground-colour, broadly dilated below middle ; an angulated black line from four-fifths costa to three-fourths inner margin, edged posteriorly by a line of leaden-metallic scales and

anteriorly by a suffused patch of same colour; a sphenoid mark on middle of costa reaching half-way across wing, centre filled with ground colour, a suffused and interrupted blackish hindmarginal line; cilia greyish, with a black line near base. Hindwings with hindmargin rounded, apex prominent: orange; a narrow fuscous hindmarginal line continued to apex and costa, where it is broader, obsolete at anal angle; cilia fuscous, with two whitish lines.

A handsome species. One specimen on a burnt log at Blackwood, S.A.

Tortricina.

TORTRICIDÆ.

Capua leucospila, *n. sp.*

Male and female, 14-15 mm. Head, antennæ, thorax, and abdomen dark-fuscous. Antennæ annulated with white. Palpi whitish-ochreous, externally fuscous. Legs fuscous, tibiæ banded with whitish. Forewings rather broad, somewhat dilated posteriorly; costa gently arched, apex obtuse, hindmargin oblique, ochreous-fuscous minutely strigulated with whitish and blackish, costa and inner margin more strongly so; outer edge of basal patch represented by a black line from one-fourth of costa to before one-half of inner margin, strongly indented below middle; central fascia light reddish-fuscous, well-defined, oblique, anterior edge from one-third of costa (almost touching basal patch) to beyond middle of inner margin, twice angulated inwards, posterior edge from same point as anterior, on costa, curved outwards to about two-thirds of disc, thence outwards to anal angle; a very distinct white spot, outlined with black, on upper portion of posterior edge of central fascia; five large quadrate spots on costa, separated by similar whitish spots, between central fascia and apex; a black hindmarginal line; cilia ochreous, with a black basal and fuscous median line, and a black tooth at apex. Hindwings greyish-fuscous, spotted with darker; cilia grey, with darker basal and terminal lines.

Easily separated by the well-marked white posterior spot. Two specimens, Golden Grove, in September; and two specimens at Glen Osmond, in October.

Capua ammochroa, *n. sp.*

Male and female, 17 mm. Head and thorax yellowish-ochreous, thorax with one or two black scales posteriorly. Palpi whitish-ochreous, fuscous beneath, and with a fuscous band at base. Antennæ and abdomen fuscous. Legs whitish-ochreous. Forewings moderate, broad; costa strongly arched, hindmargin obliquely rounded; pale whitish-ochreous, with scattered black scales; two or three black scales towards base; outer edge of

basal patch indicated by two well-defined black spots at about one-fourth, median patch very indistinct, slightly darker than ground-colour, anterior edge from one-third of costa to about middle of inner margin, posterior from before middle of costa to anal angle, with a deep wedge-shaped indentation in middle, edged somewhat by a few black scales; a small patch of black scales in disc beyond; costa and inner margin strigulated throughout with well-defined black dots, those on apical portion of costa being larger and more tooth-like; cilia pale-ochreous, with an indistinct median line at anal angle blackish. Hindwings and cilia fuscous, spotted with darker colour; cilia with a well-marked darker basal line.

Three specimens at Glen Osmond, and two at Blackwood, S.A., in October. This is a difficult species to get in good condition, but when fresh it is a very neat insect.

DICHELIA THERMATERIMMA, *n. sp.*

Male and female, 12 mm. Head, antennæ, thorax, and legs dark fuscous, tibiæ and tarsi with whitish rings, posterior legs greyish, palpi ochreous-grey suffused with fuscous, abdomen grey. Forewings elongate, moderately dilated; dark fuscous; basal patch well-defined, blackish, limited by a blacker line from one-fourth costa to one-third inner margin; a suffused blackish line from about middle of costa to about middle of inner margin; whole space of wing beyond this darker fuscous; space between last mentioned line and basal patch varying from dull-ochreous to reddish-ochreous, with a few waved obscure transverse blackish lines; a row of about seven or eight small ochreous white quadrate spots along costa throughout; cilia fuscous, tips greyish. Hindwings dark-grey, spotted with darker; cilia grey, with a darker basal line.

Always recognisable by the patch of reddish colour after basal patch. Glen Osmond, Blackwood, and Parkside, S.A., during April; rather common. Mr. Meyrick has it from Tasmania.

CONCHYLIDÆ.

HETEROCROSSA MIMICA, *n. sp.*

Male and female, 18-20 mm. Head, palpi, antennæ, thorax, and abdomen white. Antennæ annulated with fuscous, basal joint of palpi beneath fuscous. Thorax with a well-defined anterior brown band. Legs dark-fuscous, posterior pair whitish, all tarsi banded with white. Forewings elongate, posteriorly somewhat dilated, costa gently arched, apex rounded, hindmargin very obliquely rounded; white; a brownish streak on costa from base to one-fifth; four blackish equidistant oblique spots, occupying median-third of costa; an irregular triangular patch of mixed

blackish-reddish and leaden-metallic scales from inner margin at one-fourth to before anal angle, anterior edge marked by a curved black streak containing two tufts of raised black scales; a curved fuscous line from fourth costal spot to near posterior extremity of triangular patch reaching inner margin; anteriorly margined throughout by a distinct white line; a variable irregular suffusion between last three costal spots, reaching more than half-way across wing, anteriorly partly enclosing an oval black spot ringed with whitish, posteriorly bordered by a reddish transverse patch margined laterally with whitish; a suffused leaden-metallic patch above anal angle; a row of large suffused leaden-metallic spots along hindmargins and apical fourth of costa; a row of distinct black dots anterior and parallel to these; cilia leaden-metallic, with a darker median line. Hindwings pale grey, thinly scaled (in male with a large patch of dense ochreous scales occupying basal third of wing); cilia paler, with a whitish median line.

Two specimens at Parkside and two at Blackwood. In repose this species has a wonderful superficial resemblance to birds' droppings. It is a very beautiful insect, and is met with sparingly. It is most allied to the New Zealand *H. gonosemara*, Meyr.

Tineina.

GELECHIADÆ.

Gelechia leucocephala, *n. sp.*

Female, 19 mm. Head, palpi, and thorax snow-white. Thorax with an anterior blackish band, palpi with a blackish ring at apex of basal and terminal joints. Antennæ and abdomen dark-fuscous. Legs blackish, posterior pair light-fuscous. Forewings moderate, rather narrow; costa gently arched; apex round-pointed; hindmargin very oblique; fuscous, coarsely strewn with black and whitish scales; a snow-white spot at base of wing; markings black, suffused; a spot on inner margin at base; a spot in disc at one-third, another obliquely beyond and beneath it; a suffused elongate patch on costa about middle; a transverse spot above anal angle; a paler tooth of ground-colour on costa at three-fourths; cilia whitish-ochreous, with rows of black points. Hindwings dark-grey; cilia grey-whitish.

One example at Parkside, October 17th. The white head and thorax contrast effectively with the dark colour of forewings, and make the species easy of recognition.

Gelechia thermochroa, *n. sp.*

Male and female, 16-17 mm. Head dark-fuscous, postorbital rims yellowish, palpi ochreous-yellow, second joint infuscated

towards apex, apex of terminal joint whitish. Antennæ yellowish-ochreous, annulated with black. Thorax ochreous-yellow, with an anterior black band. Abdomen dark-fuscous. Legs ochreous-fuscous, with whitish tarsal rings. Forewings rather narrow, moderate; costa arched near base, thence straight; apex rounded; hindmargin very obliquely rounded; deep-ochreous, with well-defined black markings; a rather thick fascia at base, continued along inner margin to about one-fourth; a few scattered scales along inner margin; a minute dot on costa at one-sixth; a large quadrate dot in disc at one-third, and a similar one above anal angle, anterior edge sharply defined, posterior suffused; about five dots along costa from immediately above first quadrate spot to apex; between first and second costal spots, but below, is a small black spot; hindmarginal area suffusedly blackish, broader at apex; cilia dark-fuscous. Hindwings blackish; cilia dark-fuscous, with a darker basal line.

A distinct species. Two specimens from Gisborne, Victoria.

GELECHIA MACROPLACA, *n. sp.*

Male, 14 mm. Head palpi, antennæ and thorax dark-fawn. Legs fuscous. (Abdomen broken.) Forewings elongate, hardly dilated; hindmargin obliquely rounded; dark-fawn colour; a black fascia, somewhat edged with white, from one-third of costa, not reaching inner margin, slightly dilated on costa; a black spot at base of costa and a similar one beyond, both connected by a fine line along costa; a series of blackish dots along apical-fourth of costa, and continued along costa around hindmargin to anal angle, first three more conspicuous; a minute black dot on inner margin at two-thirds, and a smaller one above, surmounted by a small white spot; cilia clay-colour, base sprinkled with darker. Hindwings dark-grey; cilia grey, with a darker line near base.

Gisborne, Victoria. One specimen received from Mr. G. Lyell, junr.

GELECHIA THANATODES, *n. sp.*

Female, 10 mm. Head, antennæ, palpi, thorax, and legs dark-fuscous, suffusedly sprinkled with white, especially the legs, tarsal joints ringed with white, hairs of posterior legs yellowish. Abdomen coppery-fuscous. Forewings elongate-oblong, dilated in middle, hindmargin bowed, oblique, dark-fuscous, minutely irrorated with whitish, so as to appear ashy-grey-whitish; a small black mark along basal-fifth of inner margin; an oblique transverse series of about four or more elongate black streaks from one-fifth costa to one-fourth of inner margin; a very oblique, somewhat interrupted blackish fascia from middle of costa to anal angle; a somewhat curved series of black spots from be-

neath costa at two-thirds, continued round, and parallel to hindmargin above anal angle, the one on the angulation being the longest; a fine black hindmarginal line; cilia grey, tips whitish. Hindwings and cilia dark-coppery-fuscous.

Parkside. One specimen. Certainly allied to *Gel. loxodesma*, Meyr., of which it may prove to be a variety, but it is such a different-looking insect (especially in the hindwings) that I have decided to give it a distinctive name.

GELECHIA CENTROSEMA, *n. sp.*

Male and female, 12 mm. Head, palpi, antennæ, and thorax golden-ochreous-brown, sides of thorax whitish, face whitish palpi whitish internally. Legs grey-whitish, anterior pair infuscated externally. Abdomen dark-fuscous, anal tuft whitish. Forewings narrow, costa hardly arched, apex somewhat pointed, hindmargin extremely obliquely rounded; golden-ochreous; costa very narrowly whitish throughout; a well-defined straight whitish-ochreous median streak from base to apex, anteriorly attenuated, margined beneath with darker ground-colour; cilia dark-fuscous. Hindwings fuscous; cilia light fuscous, lighter on costa.

Three specimens, Gisborne, from Mr. G. Lyell, jun.

POGONIAS EURYPLACA, *n. sp.*

Male, 10 mm. Head, antennæ, palpi, and legs dark-fuscous; tarsi obscurely ringed with whitish, terminal joint of palpi with four whitish rings. Antennæ somewhat annulated with white. Thorax ochreous-white, patagia more ochreous with a quadrate-fuscous spot posteriorly. Abdomen blackish, anal tuft yellowish. Forewings narrow, lanceolate, blackish; an ochreous-white subquadrate patch on inner margin beyond middle, three obscure tufts of blacker scales placed triangularly, first on anterior portion of patch, second obliquely above, third near base; cilia dark-fuscous, with a few grey scales. Hindwings lanceolate, fuscous; cilia greyish.

One specimen from *Banksia marginata*, at Highbury, January 26, 1893.

XYLORYCTIDÆ.

CRYPTOPHAGA AGLAODES, *n. sp.*

Female, 50 mm. Head, antennæ, thorax and palpi white, second joint internally black at base. Legs whitish, tarsi ringed with black. Abdomen whitish; second segment broadly orange-red, others anteriorly suffused with fuscous. Forewings moderate, oblong, costa gently arched, apex rounded, hindmargin rather oblique; 2 from three-fourths; pale whitish-ochreous, slightly infuscated; costa towards apex slenderly blackish; a small

well-defined black dot in disc at one-third, and another similar obliquely beyond, at about middle; cilia whitish-ochreous, with a row of well-defined black spots at extremities of veins, and continued along apical-fourth of costa. Hindwings whitish-ochreous, 6 and 7 stalked; cilia as in forewings.

One specimen, bred from *Casuarina quadrivalvis*, at Arthurton, Yorke Peninsula, in September. Nearest *C. lurida*, Meyr., but differs by the sparse markings and wholly whitish hindwings.

Catoryctis polysticha, *n. sp.*

Female, 26 mm. Head, thorax, and antennæ fuscous, collar white, palpi fuscous, second joint externally whitish. Legs whitish. Abdomen fuscous, segmental margins dull ferruginous. Forewings elongate, costa rather strongly arched, apex somewhat pointed, hindmargin very oblique; 7 present; slaty-fuscous; markings white outlined with blackish; a moderate streak along costa from base to beyond two-thirds posteriorly strongly attenuated and leaving extreme costal edge fuscous towards base; a moderate streak from base direct to middle of hindmargin, attenuated at ends; a similar streak immediately beneath, from base to anal angle attenuated posteriorly; three rather short fine lines towards hindmargin, between last two streaks; a slender line from three-fourths of disc to costa before apex; a similar but shorter streak beneath to apex; some obscure whitish scales along inner margin indicating an unexpressed streak; cilia fuscous. Hindwings grey, posteriorly fuscous-tinged; cilia whitish with a dark-fuscous basal line.

Intermediate between "*subnexella*," Walk., and "*tricrena*," Meyr. One specimen (at light) in November, at Parkside, S.A.

Lichenaula monosema, *n. sp.*

Male and female, 12-16 mm. Head and thorax white, antennæ black. Palpi black, base of second and terminal joint white. Abdomen ochreous-fuscous. Legs whitish, slightly infuscated, posterior pair pale ochreous-yellow. Forewings elongate, costa moderately arched, apex pointed, hindmargin very obliquely rounded; shining white, slightly ochreous posteriorly; extreme costal edge blackish towards base; a distinct black spot in middle of wing above anal angle; cilia ochreous-whitish, base darker. Hindwings fuscous; cilia ochreous-white, base darker.

Var. A.—Whole of forewings suffused with light ochreous-yellow.

Parkside, Blackwood, Highbury, &c., not uncommon during December, January, and February. A neat little species, not unlike a *Scieropepla*, which I took it to be until corrected by Mr. Meyrick.

PHTHONERODES (?) LEUCOMERATA, *n. sp.*

Female, 17 mm. Head, palpi, antennæ, thorax, abdomen, and legs whitish; segments of abdomen fuscous-reddish. Forewings oblong, costa strongly arched towards base; hindmargin obliquely rounded; pale-ochreous; a suffused reddish patch of scales above inner margin near base; some scattered fuscous scales mixed with white from base along inner margin to anal angle; an indistinct irregular line from one-fourth of costa to one-third of inner margin; a similar line from five-sixths costa to above anal angle, included space strongly irrorated with white, and all veins tending to be marked with black; cilia fuscous. Hindwings grey, paler towards base; cilia grey-whitish, with a dark basal line.

One specimen (at light), Parkside, S.A. In the absence of the male, it is impossible to refer this species with certainty to its genus.

XYLORYCTA CHIONOPTERA, *n. sp.*

Female, 36 mm. Head yellowish, palpi whitish, antennæ and legs fuscous, posterior pair ochreous; thorax whitish-ochreous. Abdomen greyish, segments dull-orange. Forewings elongate, costa gently arched, hindmargin obliquely rounded; shining snow-white; costal edge blackish from base to one-fourth, rest of costa orange; cilia shining snow-white. Hindwings light fuscous-grey; cilia white, ochreous-tinged at base. Underside of all wings suffused with orange, especially on margins.

One specimen, Fernshaw, Victoria. Whether this is a *Xylorycta* or *Cryptophaga*, I am unable to say in the absence of the male. It is very similar to *luteotactella*, Walk., but longer winged.

PROCOMETIS (?) ORTHOSEMA, *n. sp.*

Female, 19 mm. Head, palpi, antennæ, thorax, abdomen and legs snow-white, two basal segments of abdomen orange, other segmental margins fuscous. Forewings elongate, rather narrow, costa gently arched, apex pointed, hindmargin strongly oblique; shining snow-white; a golden-ochreous line along costa from base to near apex, finely attenuated anteriorly; a broad golden-brown longitudinal line in centre of wing from base to apex, attenuated posteriorly; cilia snow-white, except on streak. Hindwings and cilia shining snow-white.

One specimen, Parkside, in October; also from Gippsland, Victoria, in February; a fine and distinct species. I think it is rightly referred to this genus, but absence of male makes it doubtful.

AGRIOPHARA LEUCOSTA, *n. sp.*

Male and female, 24-27 mm. Head and thorax ashy-grey-

whitish, palpi whitish, apex of terminal joint fuscous. Antennæ fuscous, basal-fourth annulated with white. Abdomen dark-grey, beneath snow-white. Legs white, tarsi with blackish apical rings. Forewings moderate, in female more elongate, costa gently arched, apex rounded, hindmargin obliquely rounded; ashy-grey-whitish; costal edge snow-white throughout; a faint short oblique blackish streak from costa at one-fourth, and another similar before middle; an indistinct longitudinal streak from near base to above anal angle; a curved series of faint blackish dots from costa at three-fourths to anal angle parallel to hindmargin; cilia fuscous, at base chequered with black and white points. Hindwings grey; darker in female; cilia grey, with two darker parting lines.

Two specimens, Parkside, October 18; beaten from *Eucalyptus rostrata*. Although most of the species of this genus are extremely similar, this species is readily known by its white costal edge. The markings of the female are more pronounced.

AGRIOPHARA LEPTOSEMELA, *n. sp.*

Male, 18 mm. Head, antennæ, and thorax dark-fuscous, post-orbital rims white. Palpi fuscous, apex of second joint white. Abdomen grey. Anterior and middle legs dark-fuscous with whitish tarsal rings, posterior pair grey-whitish, tarsi fuscous with whitish rings. Forewings elongate, rather narrow, costa gently arched, apex rounded, hindmargin obliquely rounded; ashy-grey, with well-defined black markings; veins tending to be streaked with blackish; a suffused spot on costa at about one-third; another similar on costa before middle, both indicating unexpressed fasciæ; a slender line from base of costa to anal angle; another similar immediately beneath, but not reaching base or anal angle, and a third similar streak from base to near anal angle, terminating in a suffused patch of scales; a suffused dot midway in disc near termination of first line and resting on its upper extremity; a rather thick suffused streak at termination of first streak to below middle of hindmargin; a few scattered black scales above and below this; cilia grey, basal-half blackish with a few white points. Hindwings whitish-grey, darker posteriorly; cilia grey, with distinct darker basal line.

One specimen, Parkside, in October. Between *cinerosa*, Rosen., and *axesta*, Meyr., but distinct from either.

ŒCOPHORIDÆ.

HELIOCAUSTA IOZONA, *n. sp.*

Male, 32 mm. Head, thorax, and antennæ greyish-ochreous. Antennæ strongly tinged with carmine basally, thorax with a

posterior carmine spot. Palpi ochreous-whitish, apex of second and terminal joints carmine-tinged. Legs ochreous-white, anterior and middle pair carmine-tinged. Abdomen ochreous-whitish, segments suffused with orange-fuscous. Forewings oblong, rather broad; costa strongly arched near base; hindmargin somewhat sinuate, rounded beneath; greyish-ochreous; costa broadly carmine throughout; inner margin carmine from base to one-fourth, followed by a few carmine scales; a broad fuscous carmine, nearly straight, oblique band from one-third of costa to middle of inner margin, dilated beneath, anterior edge well defined, posterior somewhat suffused; a fuscous-carmine suffused dot in disc at one-third, and a larger one more suffused obliquely beneath; indications of a curved series of fuscous carmine dots from above anal angle to two-thirds across wing; cilia fuscous-carmine, mixed with greyish-ochreous, especially around anal angle. Hindwings ochreous-whitish, posteriorly carmine-tinged, more pronounced at apex; cilia whitish-ochreous, with a grey parting line at apex. Underside of forewings, with costa and posterior two-thirds, strongly suffused with rosy.

One specimen, Blackwood, S.A., at light, in May. A very handsome species, having the fascies of a *Euchætis*. It is exceptionally distinct from all others known to me by the broad band of forewings.

HELIOCAUSTA EUSPILOMELA, *n. sp.*

Male, 28 mm. Head, palpi, antennæ and thorax ochreous-fuscous, thorax anteriorly darker-fuscous. Palpi externally white. Face white. Legs ochreous-whitish, faintly carmine-tinged. Abdomen fuscous. Forewings moderate, costa moderately arched, more strongly towards base, apex obtuse; hindmargin almost straight, slightly rounded; ochreous-fuscous; costa narrowly pale-carmine throughout; markings rather obscure; three black dots at base in a line between costa and inner margin; a tranverse row of black dots from beneath costa at one-third to middle of inner margin, from apex of these proceeds an outwardly curved row of similar dots to about anal angle; immediately beyond this is another strongly-defined curved row of similar dots ending at anal angle; a hindmarginal row of black dots; cilia greyish-ochreous, with a darker parting line. Hindwings and cilia pale grey-whitish.

One specimen, Parkside (at light), in October. An obscure looking species. Nearest to *severa*, Meyr.

EUCHÆTIS CRYPSICHROA, *n. sp.*

Male, 23 mm. Head, palpi, antennæ, thorax and abdomen greyish-ochreous, face whitish; palpi externally whitish. Legs ochreous-whitish, anterior and middle pair (except coxæ)

carmine-tinged. Forewings moderate, costa rather strongly arched especially towards base, hindmargin almost straight, slightly sinuate, rounded beneath; greyish-ochreous; costal edge carmine throughout, extreme costal edge ochreous-grey-whitish from about one-third to apex; a few ferruginous scales along inner-margin near base; a darker ferruginous spot in disc at one-fifth, and another immediately below it, a large transverse fuscous-carmine blotch occupying median third of wing, anterior edge inwards curved from about one-fourth of costa to about middle of inner margin, posterior edge from near apex to anal angle strongly curved inwards; on centre of posterior edge of this patch is a well-defined ferruginous spot; the patch is bounded on either side by a variable reddish suffusion; an irregular curved row of ferruginous spots from anal angle and ending in patch above middle; cilia dark-fuscous carmine, tips whitish, round anal angle wholly grey-whitish. Hindwings pale-yellowish; cilia paler, with a dark-grey basal line.

One specimen, Blackwood, S.A., beaten from *Eucalyptus*, sp. ("Stringybark") in October. Apparently most allied to *metallota*, Meyr., but without any white spots.

EUCHÆTIS SARCOXANTHA, *n. sp.*

Female, 20 mm. Head, palpi, legs, antennæ, abdomen, and thorax ochreous-yellow, antennæ and anterior legs carmine-tinged. Thorax with a suffused leaden-metallic posterior spot, edged posteriorly with dull carmine, shoulders carmine-fuscous. Forewings elongate-oblong, costa strongly arched, hindmargin bowed, oblique; ochreous-yellow, suffusedly irrorated with carmine, especially on edges of markings; markings leaden-metallic; a rather thick costal streak from base of costa throughout and continued uninterruptedly around hindmargin to anal angle, extreme costal edge carmine, becoming paler towards apex; a small ill-defined streak from base of costal streak; a semi-erect mark from inner margin near base reaching half-way across wing; an irregular triangular patch about third of costa, from which proceeds a row of four or five well-defined dots to near anal angle; a large irregular suffused patch from one-fourth of inner margin to anal angle occupying half of wing, in upper portion are three much darker discal spots, one larger about middle of wing, and two others beyond and placed one above the other, all edged posteriorly with a small patch of ground-colour, making them conspicuous; cilia on upper-half of hindmargin and apex reddish-orange, rest metallic-coppery. Hindwings and cilia orange.

A fine species; the apex of wing is so rounded that vein 7 seems to fluctuate between apex and hindmargin. Kewell, Victoria; one specimen, from Mr. J. A. Kershaw.

ZONOPETALA (?) STENOPTERA, *n. sp.*

Male, 15 mm. Head, thorax, and palpi white, thorax with a posterior fuscous patch or band; basal two-thirds of second joint of palpi dark-fuscous, legs and abdomen yellowish, anterior legs dark-fuscous. Forewings moderate, costa gently arched, hindmargin obliquely rounded; white, somewhat ochreous-tinged; costal edge pale-yellowish throughout, except at base and on second fascia; a narrow blackish fascia at base; a golden brown, rather narrow fascia, dilated on costa and inner margin from about one-fifth costa to middle of inner margin; an inwards curved similar fascia from three-fourths of costa to anal angle, anteriorly edged with blackish and well-defined, posteriorly suffused; a fine fuscous streak from apex of this to above anal angle; a suffused fuscous patch near apex, containing a blackish curved streak along hindmargin; cilia yellow, towards apex fuscous-tinged. Hindwings pale yellowish, with a distinct fuscous apical spot; cilia yellow, fuscous-tinged at apex.

Trafalgar, Victoria; two specimens received from Mr. J. A. Kershaw. As the heads of the specimens are covered partly with mildew, I am not quite certain as to the proper genus. It seems referable here.

EULECHRIA GYPSOTA, *n. sp.*

Male and female, 23-30 mm. Head, antennæ, and thorax greyish-fuscous. Palpi whitish, externally infuscated, especially at apex of basal joint. Abdomen ochreous-fuscous, segments greyish. Legs dark-fuscous, posterior pair ochreous-whitish. Forewings moderate, elongate; costa gently arched, apex rounded, hindmargin obliquely rounded; whitish, with fuscous markings somewhat suffused; a broad costal streak from base to two-thirds, posteriorly attenuated, leaving extreme costal edge white; a variable suffusion along inner margin from near base to near anal angle; a black dot in disc at one-third and another immediately below it, somewhat larger; a black dot in disc beyond middle resting on costal streak, a variable suffusion in middle of disc; a distinct crescentic mark beneath apex of central streak, immediately followed by a variable suffusion above anal angle; a curved interrupted streak from costa near apex to anal angle, indented beneath costa; a hindmarginal row of elongate dots; cilia grey-whitish. Hindwings rather dark-fuscous; cilia paler, with two indistinct grey lines.

Six specimens, Belair, S.A., November 14th; beaten from *Eucalyptus*. A conspicuous species belonging to the "Adoxella Group," *Meyr.*, but broader-winged.

EULECHRIA XANTHOCEPHALA, *n. sp.*

Male and female, 18-20 mm. Head orange, antennæ fuscous,

ciliations two. Palpi and thorax ochreous-whitish, palpi externally fuscous. Abdomen grey, anal tuft yellowish. Forewings elongate, moderate; costa gently arched, apex somewhat pointed; hindmargin rounded, oblique; shining white, somewhat yellowish-tinged, especially round margins; costal edge blackish at base; markings blackish, well-defined; a small dot in middle of wing; a similar spot before and below it; a larger spot in disc at about two-thirds; a similar spot at apex, and a longer one placed obliquely between these, but nearer to apical one; cilia ochreous-white, basal-half yellowish-tinged. Hindwings grey, cilia as in forewings.

Several specimens at Blackwood and Highbury in March. Allied to *elæota*, Meyr., but without any costal streak, and the dots differently placed. In one specimen veins 4 and 5 of the forewing are very closely approximated at base.

Eulechria adelphodes, *n. sp.*

Male and female, 22-25 mm. Head, palpi, antennæ, thorax, and legs dark fuscous, palpi irregularly suffused with whitish, coxæ of anterior legs white. Antennæ obscurely annulated with white ciliations. Abdomen greyish-fuscous, segmental margins somewhat ochreous. Forewings elongate, costa somewhat sinuate in middle, hindmargin obliquely rounded; dark-fuscous, irregularly mixed with ashy-grey-whitish; markings very suffused, hardly traceable; a very thick black streak from base to middle of disc, where it meets a tolerably well-defined small patch of white scales; from lower extremity of this streak proceeds a narrow black interrupted line from base to near anal angle; a strongly-curved row of elongate black marks from three-fourths of costa to three-fourths of inner margin, those on upper portion more elongate; a hindmarginal row of elongate spots; cilia ashy-grey-whitish, base sprinkled with black. Hindwings dark-fuscous; cilia grey, with darker basal and terminal lines.

Very near "*athletis*" and "*dryinodes*," Meyr., but markings much thicker, hindwings darker and stronger built. On bark of *Eucalyptus rostrata*, where they are difficult to discern; taken at Parkside, S.A., commonly in May.

Eulechria lithodora, *n. sp.*

Male, 16 mm. Head, palpi, thorax, antennæ, and abdomen slaty-grey, posterior legs greyish-ochreous. Antennæ whitish towards base, ciliations two. Forewings moderate, costa slightly arched, hindmargin obliquely rounded, slaty-grey; a narrow narrow whitish costal streak from very near base to apex; cilia pale slaty-grey, tips whitish. Hindwings dark-grey; cilia grey-whitish, basal half fuscous, lighter towards anal angle.

A neat-looking species, having a silky appearance, and somewhat the facies of a *Philobota*. One specimen at Blackwood in November.

LINOSTICHA CHRYSOLOMA, *n. sp.*

Male, 10 mm. Head, palpi, antennæ, thorax, and abdomen blackish, palpi internally whitish, second joint with a white apical ring, terminal joint spotted with whitish at base. Legs dark fuscous, posterior pair yellow, tibiæ and tarsi ringed with whitish. Forewings with costa slightly arched, apex rounded, hindmargin obliquely rounded; dark-fuscous; cilia dark-fuscous, tips lighter. Hindwings bronzy-fuscous; cilia golden-orange, apical-third fuscous-tinged.

An interesting little species, known by the small size and golden cilia of hindwings. One specimen, Parkside, in May.

LINOSTICHA DICHROA, *n. sp.*

Male and female, 17-22 mm. Head and thorax dark-fuscous, sprinkled with whitish. Palpi fuscous, minutely sprinkled with whitish. Antennæ fuscous, annulated with whitish. Abdomen blackish. Legs dark-fuscous, anterior tibiæ banded with white, posterior pair densely clothed with long orange hairs. Forewings elongate, slightly dilated posteriorly; costa nearly straight, somewhat arched near apex; apex round-pointed; hindmargin obliquely rounded; dark-fuscous, more or less irrorated suffusedly with whitish, so as to appear ashy-grey-whitish; a black dot in disc before middle, a second on fold obliquely beneath and beyond it, and a third in disc at two-thirds; a slender suffused blackish streak beneath costa from base to third discal dot, sometimes continued to anal angle; a hindmarginal row of suffused black dots, continued along apical third of costa; cilia ashy-grey-whitish, tips paler. Hindwings clear-orange, paler in some specimens; cilia fuscous-yellowish.

Common at Parkside, in October, on post and rail fence during a high wind. Probably dislodged from the adjoining *Eucalyptus rostrata;* the species is easily known by the hindwings. In the present genus vein 7 of the forewings extends to the apex, but in the present species it is continued slightly above, or more correctly to costa; though it is undoubtedly rightly referred.

NEPHOGENES XYLOCHROA, *n. sp.*

Male and female, 25 mm. Head, thorax, palpi, and antennæ ashy-fuscous. Legs dark-fuscous, posterior pair and all tibiæ light ochreous-yellow. Abdomen ochreous. Forewings elongate, moderate, posteriorly dilated, especially in male; costa rather

strongly arched, apex rounded, hindmargin rounded oblique; fuscous, strewn with darker fuscous and whitish scales; markings blackish; a suffused mark near base forming an indistinct fascia; a thick streak along costa from base to beyond middle, posteriorly attenuated; a dot in disc at one-third, another immediately below it; an elongate spot midway but slightly beyond these; two spots immediately above this; an indistinct crescentic series of three spots immediately below apex of costal streak; a streak from costa at about three-fourths to anal angle, indented below costa; a hindmarginal series of dots, apical portion more elongate; cilia fuscous, at base yellow with a distinct darker median line. Hindwings and cilia ochreous, more or less fuscous-tinged. In the female the markings are almost obliterated through the density of the ground-colour, and the hindwings are darker.

This species is usually found at rest on trunks of *Eucalyptus*, and are consequently difficult to perceive on account of their colour. Two specimens were taken at light, Parkside, in September; and eight specimens in October.

Philobota platyptera, *n. sp.*

Male, 36 mm. Head, thorax, and palpi slaty-grey. Abdomen grey-whitish, posterior segments dull-orange. Antennæ whitish-ochreous. Legs fuscous, posterior pair ochreous-whitish. Forewings elongate ovate, moderate, broad; costa gently arched, apex rounded, hindmargin obliquely rounded; slaty-grey, extreme costal edge blackish; a broad white costal streak from base to near apex, attenuated posteriorly, margined beneath throughout by a dark slaty-grey shade, more pronounced anteriorly where it becomes blackish; cilia greyish, terminal-half lighter. Hindwings ochreous-grey whitish; cilia grey.

One fine specimen beaten from *Styphelia Sonderi* at Teatree Gully, S.A., 1st September. The largest of the genus, and very distinct from any other species.

Philobota Idæ, *n. sp.*

Male and female, 22-24 mm. Head and thorax orange, thorax with an anterior light-fuscous spot. Palpi ochreous-whitish, externally infuscated, except at base. Antennæ fuscous. Abdomen and legs pale yellowish-ochreous, anterior and middle pair infuscated. Forewings elongate, costa slightly arched, apex round-pointed, hindmargin oblique; shining snow-white, with brownish markings; a thick streak from base to costa at three-fourths, thence continued along costa to apex, leaving costal edge for its own width white; extreme costal edge fuscous; lower edge of

brown streak emitting two large teeth, one before one-half, and one at about two-thirds, larger and strongly curved inwards; an irregular streak from base of subcostal streak to anal angle, upper edge with two projections, first almost touching first tooth of subcostal streak, second near anal angle; a streak along inner margin, with a projection upwards near middle, from base and joining median streak at second tooth; an elongate wedge-shaped spot from anal angle reaching about three-fourths across wing; anterior edge suffused, posterior sharply defined; a suffused hind-marginal line, anteriorly suffusedly edged with a streak of orange; a nearly straight orange streak from base to anal angle, cut in middle and at base by the median biangulated line; cilia dark-fuscous, tips paler, with a snow-white tooth at apex. Hindwings fuscous, apex ochreous-tinged; cilia pale-greyish, ochreous-tinged round apex.

Five specimens, taken at Blackwood by my sister, to whom I have dedicated it. A remarkably distinct and beautiful species, most allied to *iosema*, Meyr.

PHILOBOTA PORPHRYXANTHA, *n. sp.*

Male, 22 mm. Head yellow, palpi yellowish, thorax purplish-fuscous, yellow posteriorly, and with a yellow spot on each shoulder. Antennæ, abdomen, and legs dark-fuscous, posterior legs yellowish. Forewings elongate, costa gently arched, apex pointed, hindmargin very obliquely rounded; bright yellow; markings purplish-black; a moderate fascia at base, apex continued narrowly along to about one-third, posteriorly attenuated; a thick streak proceeding from submedian fold before middle to costa beyond middle, and continued along it to apex, posteriorly attenuated; from middle of lower portion of this streak proceeds a somewhat thicker streak direct to anal angle; a moderate streak along hindmargin from anal angle to apex, dilated above; cilia dark-fuscous, base yellowish-tinged. Hindwings dark-fuscous; cilia as in forewings, but more yellowish round anal angle.

Stawell, Victoria; ten specimens. Nearest *ophiodes*, Mey., and the preceding species, but differs in position of markings and shape of wing.

CŒSYRA PORPHYRYPLACA, *n. sp.*

Male, 17 mm. Head and palpi orange-yellow, legs and antennæ dark-fuscous, posterior pair yellowish. All tibiæ and tarsi ringed with yellowish, thorax purplish-fuscous, abdomen fuscous, anal tuft orange. Forewings elongate, costa slightly arched, apex somewhat pointed, hindmargin obliquely rounded; orange; a narrow oblique black fascia at base; a large reddish-

purplish patch, nearly occupying posterior half of wing, anteriorly edged with darker, from three-fifths costa to beyond middle of inner margin, strongly curved; cilia orange, on anal angle fuscous-tinged. Hindwings and cilia ochreous-fuscous.

Port Lincoln, S.A.; one specimen. Perhaps a variety of *dichroëlla*, Zell., but the form of fascia is quite different, and wing more rounded.

MACROBATHRA PARACENTRA, *n. sp.*

Female, 17 mm. Head, palpi, and thorax yellowish-ochreous, terminal joint of palpi externally fuscous, thorax with a purplish quadrate anterior spot. Antennæ fuscous, annulated with yellow, abdomen and legs dark-fuscous, posterior pair yellow. Forewings elongate lanceolate; ochreous yellow; extreme base of costa dark-fuscous; a curved brownish-purple, on lower-half black, anterior edge of fascia from two-thirds costa to one-half inner margin, posterior from two-thirds costa to anal angle; a purplish-fuscous hindmarginal patch indented in middle anteriorly; cilia yellow, at anal angle fuscous. Hindwings and cilia fuscous.

Immediately recognisable by absence of first fascia. One specimen, Gisborne, Victoria (G. Lyell, jr.).

MACROBATHRA ISOSCELANA, *n. sp.*

Female, 19 mm. Head, thorax, and antennæ dark fuscous, antennæ slightly annulated, palpi fuscous, internally edged with whitish, tip of terminal joint whitish. Abdomen greyish, anal tuft yellowish. Legs fuscous, tibiæ and tarsi ringed with white, posterior pair ochreous-fuscous. Forewings elongate, lanceolate; dark purplish-fuscous; a conspicuous yellow triangular spot on costa at three-fourths; cilia fuscous, tips paler, at anal angle greyish. Hindwings greyish-fuscous; cilia greyish-fuscous, tips paler.

One specimen, Blackwood, 25th October. A neat and easily recognised species; in the neighbourhood of *M. porphyrea*, Meyr.

GLYPHIPTERYGIDÆ.

GLYPHIPTERYX LYELLIANA, *n. sp.*

Male and female, 15-16 mm. Head, thorax, antennæ, and abdomen blackish-fuscous, anal tuft yellowish. Collar broadly dark-ochreous. Palpi golden-ochreous, apex of terminal joint blackish. Legs blackish-fuscous, apex of tarsi obscurely ringed with whitish. Forewings moderate, costa gently arched, apex round-pointed, hindmargin rounded, rather oblique; dark golden-ochreous, with brassy-metallic markings, well-defined and irregularly margined with black scales; a curved line from middle of

base to inner margin before middle, but not quite reaching it ; a curved, anteriorly produced fascia from one-fourth of costa to one-third of disc, reaching half-across wing ; a slightly curved fascia from middle of costa to middle of inner margin, contracted in centre ; a strongly curved streak from two-thirds of costa to about middle of disk ; a streak from apex to immediately above anal angle, near and parallel to hindmargin, apical portion whitish, and produced along costa posteriorly ; midway between last two streaks is an elongate spot ; an irregular triangular patch above anal angle, at the upper extremity of which are two very distinct black dots, one on each side ; cilia grey-whitish, with a blackish basal line. Hindwings dark-fuscous ; cilia light-fuscous, with a whitish basal line.

Two specimens from Mr. G. Lyell, junr., of Gisborne, Victoria, an esteemed correspondent, to whom I have dedicated the species. It is immediately recognisable by the black spots above anal angle.

GLYPHIPTERYX PLATYDISEMA, *n. sp.*

Male and female, 8-10 mm. Head, antennæ, thorax, palpi, and abdomen dark-fuscous, palpi with three rings of whitish scales, segments of abdomen and anal-tuft whitish, legs blackish, tarsi and tibia broadly-banded with white. Forewings moderate, slightly dilated posteriorly, apex pointed, hindmargin sinuate beneath apex ; blackish-fuscous, somewhat purple shining ; a broad, straight, whitish fascia from one-sixth costa to one-sixth inner margin, posterior edge with a slight concavity above middle ; a similar, almost parallel, fascia from two-fifths costa to about middle of inner margin, slightly attenuated on costa ; a violet metallic line from beyond middle of costa to anal angle, slightly angulated outwards in middle ; three short whitish fascia from costa between this and apex, lower portion violet metallic, the first longest, reaching half-way across wing ; some golden-metallic scales along hindmargin at anal angle and towards apex ; cilia blackish, terminal one-half white, with a blackish tooth at apex, and a whitish indentation at about middle of hindmargin. Hindwings and cilia dark-fuscous.

Allied to *G. meteora*, Meyr., but distinct by the two anterior fascia going right across wing, and other points. Four specimens, bred by Mr. G. Lyell, Jun., of Gisborne, Victoria ; larvæ feed in stems of rushes.

GLYPHIPTERYX HALIMOPHILA, *n. sp.*

Male and female, 7-9 mm. Head and thorax shining-bronzy-fuscous, thorax with a longitudinal white stripe on each side. Palpi fuscous, with black rings, whorl of hairs whitish. Antennæ blackish. Abdomen shining-bronzy-fuscous. Legs dark-fuscous,

tarsi with whitish apical rings, posterior tibiæ with whitish central and apical rings. Forewings moderate, slightly dilated, shining-ochreous-bronze; markings white, margined with black, a longitudinal streak from base to two-thirds, separated from inner margin by its own width of ground-colour; an oblique streak from costa before middle, reaching about half-across wing; a similar streak hardly beyond middle, and a streak from anal angle, extremities meeting, latter portion metallic-purple; a streak from two-thirds of costa to anal angle, lower two-thirds purplish-metallic; a triangular tooth immediately before apex containing two wedge-shaped streaks of ground-colour, broader beneath; a round black spot immediately below apex, its lower edge containing a few purple-metallic scales; a patch of purple-metallic scales near anal angle, almost confluent with third costal streak; cilia dark-fuscous, tips white; a white tooth immediately below apex, and another below the round black spot. Hindwings fuscous; cilia fuscous, paler towards base.

Common at Glenelg, S.A., in September, frequenting *Lepidosperma gladiatum*. In markings allied to *Phrygonostola euthybelemna*, Meyrick, but differs in position and breadth of markings, besides being a smaller insect.

DEPRESSARIDÆ.

Pachycera catoryctopsis, *n. sp.*

Male and female, 23-27. Head and antennæ white, antennæ beneath annulated with fuscous, palpi, thorax and legs ashy-grey-whitish, hairs of posterior legs yellowish-tinged, abdomen grey. Forewings moderate, costa gently arched, hindmargin obliquely rounded; fuscous, suffusedly mixed with whitish; a white streak along costa from base to beyond middle, attenuated posteriorly and continued to near apex, the anterior portion containing a fine grey line, lower portion edged with a fine black line; an elongate white mark in middle of wing, outlined with black; a thick white streak from base along fold, suffusedly continued to near anal angle, partially edged below with a fine black line; all veins towards hindmargin sharply defined by black lines, interspaces filled with white; a hindmarginal row of black dots; cilia ashy-grey-whitish, tips darker. Hindwings grey; cilia white, with a darker line.

Highbury and Blackwood in March; four specimens. Resembles greatly *Catoryctis tricrena*, Meyr., one of the Xyloryctidæ.

ELACHISTIDÆ.

Stathmopoda callichrysa, *n. sp.*

Female, 12 mm. Head and palpi ochreous-yellow, thorax

purplish-fuscous, abdomen dark-fuscous, anal tuft yellowish. Legs and antennæ fuscous. Forewings elongate, apex pointed bright golden-yellow; a purplish fuscous basal patch, hardly as wide as wing; a similar patch occupying apical one-half of wing, and a narrow line along costa connecting the two; cilia golden-brown. Hindwings and cilia golden-brown.

One specimen bred from Wattle-gall (species of *Acacia* unknown), by Mr. J. A. Kershaw, of Melbourne, Victoria, November 24, 1892.

On the Poisonous Constituents of Stephania hernandifolia.

By Professor Edward H. Rennie, M.A., D.Sc., and E. F. Turner.

[Read June 6, 1893.]

Some considerable time ago, Dr. Thomas L. Bancroft, of Brisbane, forwarded to us for examination a quantity of the roots of *Stephania hernandifolia*, Walpers. He had found that an extract of the roots was exceedingly poisonous to frogs, and published an account of his experiments in vol. IV. (series 2nd) of the Proceedings of the Linnæan Society of New South Wales (27th November, 1889.) He pointed out that the physiological action of the active substance appeared to be identical with that of *picrotoxin*, the active principle of *Cocculus*, a genus of the same order as *Stephania*, but having failed to obtain picrotoxin from the plant, he suspected the poisonous effects to be due to an alkaloid.

In order to isolate the active substances, the following method was adopted :—The roots cut up into fragments were exhausted with boiling alcohol, the alcohol distilled off, the residue extracted repeatedly with boiling water, and the solution filtered. While still warm basic lead acetate was added, and the liquid filtered again through linen. The excess of lead was then precipitated by dilute sulphuric acid, and the acid liquid, after filtration, extracted with chloroform. The chloroform having been distilled off, the residue, which was crystalline, was repeatedly recrystallised from boiling water till colourless and apparently pure. Various samples of the substance thus prepared melted at temperatures varying from 193° C. to 197° C. The substance so obtained closely resembled picrotoxin in external characters, and was intensely bitter. The melting point of picrotoxin is variously given as from 199° to 201° C. Authorities differ as to its exact composition, and it is apparently very liable to decomposition and change. According to the latest and most authoritative statements there are two substances, much alike, and both very bitter and poisonous, called *picrotoxin* and *picrotoxinin*, the latter arising from the decomposition of the former, the formulæ ascribed to these substances being respectively $C_{30}H_{34}O_{13}$ and $C_{15}H_{16}O_6$

The substance obtained by us gave the following results on combustion :—

Substance taken.	CO_2.	H_2O.
·2128	·4756	·126
·2124	·4710	·1107

Calculated for $C_{30}H_{34}O_{13}$.	Calculated for $C_{15}H_{16}O_6$.	Found I.	Found II.
C 59·80	61·64	60·95	60·52
H 5·64	5·47	6·50	5·79
O 34·56	32·89	—	—
100·00	100·00		

A sample of picrotoxin purchased some time ago was subjected to various modes of treatment, being recrystallised in different ways, and gave the following percentage of carbon and hydrogen :—

Carbon ...	60·66	61·06	60·10	61·90	60·79
Hydrogen...	—	6·31	5·78	6·20	5·91

It will be seen that the figures obtained by us for the substance from *Stephania* come well within the limits of those obtained from different samples of genuine picrotoxin. We have no doubt whatever, therefore, that the crystalline substance obtained as above described from *Stephania*-roots is picrotoxin, or a mixture of picrotoxin and picrotoxinin. Dr. Stirling kindly injected some of the aqueous solution into the dorsal lymph sac of a frog. Violent convulsions speedily set in, resulting in death—a result quite in accordance with the known physiological effects of picrotoxin.

There was, however, reason to suspect that some other poisonous matter was present in the roots besides that just described. The acid liquid, therefore, from which the picrotoxin had been thoroughly extracted by chloroform, was made alkaline with caustic soda. This caused the precipitation of a substance which, however, dissolved in excess of soda, but was partially reprecipitated on the addition of sodium bicarbonate. The precipitate was filtered off, and the alkaline solution extracted with ether. The ether, on evaporation, left a yellow amorphous mass which gave all the characteristic reactions of an alkaloid ; but from which no crystalline salts could be obtained. Its chief chemical characteristic was the brilliant green colouration which it gave on the addition of strong sulphuric acid. We at first suspected the presence of *berberine*, but all efforts to isolate this alkaloid have so far failed. The yellow alkaloid was not obtained in sufficient quantity for analysis. It is very easily decomposed ; for instance, if dissolved in dilute acetic acid and evaporated on

the water bath or even *in vacuo*, the residue is darker in colour, and partly insoluble in water, but if the solution be made alkaline and again extracted with ether, the yellow residue is again obtained on evaporation. A solution of this substance is intensely poisonous, but possesses physiological properties very different from those of picrotoxin. Injected into the dorsal lymph-sac of a frog in a large dose it produced complete paralysis and speedy death *without convulsions.*

No definite satisfactory results could be obtained with the substance referred to above, as partially precipitated from the caustic soda solution or addition of sodium bicarbonate; but it appeared to possess poisonous properties.

We forwarded a small quantity of the solution of the yellow alkaloid to Dr. Bancroft, who sent us the following account of its effects:—"This substance was intensely poisonous, and produced death in a frog in quite a different manner from the 'Stephania' extract, or from picrotoxin. There was excessive vomiting at first, then extreme irritability, so that the slightest touch produced exaggerated movements. The reflex excitability of the spinal chord was increased quite as much, or more perhaps, than by strychnine, yet there were no tetanic convulsions produced. Nevertheless there were what might be termed moderate convulsions. I suppose if the dose were very great death would occur without convulsions, yet it would be hardly right to say there were no convulsions, if less then a lethal dose be given. There are some remarkable phenomena connected with the respiration, leading one to think the substance was a respirating stimulant. It seems to have no bad effect on the heart."

Perhaps in the future we may be able to do more towards the investigation of these substances, but at present the material is exhausted and time is wanting.

On Some New Species of Australian Marine Gastropoda.

By Professor Ralph Tate.

Plate I.

[Read June 6, 1893.]

Sipho (?) mimeticus, *spec. nov.* Pl. i., fig. 10.

Shell pyriform, imperforate, uniformly sordid-white, whorls four and a-half, suture distinct but not canaliculate; embryo of one and a-half turns, naticiform, smooth; first spire-whorl and anterior-half of second angulated medially; the rest angulated over the suture, flatly-convex behind, with five revolving threads at the posterior suture a double thread which is slightly crenulated by oblique slender costæ fading-off anteriorly into threads.

Body-whorl ventricose in front of the periphery, periphery ornamented with subacute nodulose crenatures (about twelve), posterior area slightly concave with five raised threads finely and closely elevate-striated in the intervals, at the suture a thickened lira which is slightly crenulated; anterior part of body-whorl with raised threads, which are more or less equal and equidistant.

Aperture rhomboid-oval; outer lip smooth within; columella covered with a thin callus, regularly concave; the base is gradually contracted into a moderately-elongated snout, nearly as long as the aperture, bent to the left and slightly upturned.

Dimensions.—Total length, 15·5; greatest diameter, 8·5; length of aperture, 12; width of aperture, 4.

Habitat.—Dredged by Mr. E. H. Matthews, on December 31, 1888, from a sandy bottom on Tapley's Shoal, about eight miles off Edithburgh, in 12 to 16 fathoms (one dead specimen).

Affinity.—This shell is probably immature and its generic location is uncertain. It has a general resemblance to *Fulgur canaliculatus*, Linn., from the young of which it is separable by its more ventricose body-whorl, shorter and more tortuous snout, and generically by the absence of a columella-fold. It bears a resemblance to some species of *Sycum*, though the form of the embryo and the smooth test in that genus prohibit its attachment thereto. It is also like *Streptosiphon porphyrostoma*, which has, however, an oblique double fold on the columella.

Taking separately the conchological characters of this shell

not one of them will exclude it from *Sipho*, though the facies is not proper to this genus ; here I tentatively place it, awaiting fuller material to determine its proper classificatory position.

Columbella (Mitrella) vincta, *spec. nov.* Pl. i., fig. 11.

Shell small, narrowly oval, shining light-horn (dead shells white) with a *revolving red or brown band* next to the anterior suture. Nuclear whorls one and a-half, smooth, globose, with a small blunt tip. Spire-whorls five, very slightly convex (abruptly but feebly so at the posterior suture). Aperture oval, outer lip 7-dentate within.

Dimensions.—Height, 9·5 to 10 ; diameter, 4·25.

Localities.—Fowler and Streaky Bays, Middleton, and Cape Northumberland, S. Australia ; also north coast of Tasmania.

This species in respect of coloration is readily recognised by its brown band, which though of variable width is always margined with white at the posterior suture ; the band is usually uninterrupted, but is occasionally scalloped at its posterior margin, or at both margins on the body-whorl. In shape and size it is near *C. dictua*, Ten.-Woods, but is narrower, and the whorls are not so flat ; also near *C. lineolata*, Pease, but is much narrower. The proportion of height to width is, in *C. vincta*, 100 to 45 and 42·5 ; in *C. dictua*, 100 to 47.

Cerithiopsis marmorata, *spec. nov.*

Shell elongately acuminated, *marbled* with white and brown, encircled by rounded cinguli and axially striated in the intervals. On the posterior whorls there are four cinguli ; five on the penultimate ; five on the body-whorl posterior to the periphery, with or without a slender one interposed between the first and second from the suture ; the base with one cingulus in front of the periphery.

Dimensions.—Height, 15 (estimated) ; width, 3·25.

Localities.—Head of Great Australian Bight, Streaky and Fowler Bays, St. Vincent Gulf, Middleton, Cape Northumberland.

Affinity.—This species is more elender than *C. crocea*, and stouter than *C. purpurea*, but with a distinctive coloration. In ornament it approximates to *C. crocea*, but appears to have more cinguli on the body-whorl.

Bittium estuarinum, *spec. nov.* Pl. v., fig. 12.

B. pyramidale,* Tate, m.s.

---

* As the name *pyramidale* is already occupied in some closely-related genera, *e.g.*, *Potamides* and *Cerithium*, I have thought it safer to select that of *estuarinum*, which is not in use for any species of the Family Cerithiidæ, and thus avoid the possibility of duplication.

Shell elongate, stoutish; apex acute; whorls about twelve, convex, the uppermost whorls angulated medially, covered with a bluish-black to grey epidermis beneath which the colour is reddish; suture distinct. Base convex. Aperture circular, slightly angulated and effuse at the base of the columella; shining-black within; outer lip thin and arcuate; columella arched, obliquely excavated so as to form a slightly-raised border exteriorly. Operculum circular and multispiral.

Ornament consisting of depressed spiral threads, five or six on the penultimate whorl, and of slightly-arched plicæ (from eleven to fifteen on penultimate whorl) which terminate abruptly at the second lira from the anterior suture; the liræ as they pass over the plicæ produce nodular crenatures; the whole surface is sculptured with fine arcuate striæ. The plicæ vary much in strength, rarely obsolete; in the latter case the shell approximates to *B. Lawleyanum*, from which it is conspicuously distinguished by its elongate form, less dense, and more thread-like spiral ornament. The base is concentrically ridged and transversely striated.

Dimensions.—Of a large specimen, length 22, major diameter of base, 5; of a medium-sized specimen, length 17, major diameter of body-whorl, 4·5. The proportion of length to the basal diameter varies from 100 to 22·5 to 100 to 33; but the extremely-broad forms are rare.

Habitat.—Living on the mud, between tide-marks, Port Adelaide Creek; Franklin Harbour; in shallow water on *Zosteræ* in Lake MacDonald, West Coast.

Affinity.—The plicate ornament without distinctive granulation reduces the comparison of this species to a very few congeners; but the non-plicate supra-sutural area, the number of the spiral liræ and the elongate form separate it from all of them.

Torinia foveolata, *spec. nov.* Pl. i., fig. 13-13a.

Shell small, depressed, slightly convex, semitransparent-white; whorls of rather slow increase, four, separated by an impressed suture, but not conspicuously channelled. Last whorl angulated at the periphery; base rounded, profundly and widely umbilicated. Aperture quadrately rounded.

Ornament of penultimate whorl consisting of four spiral riblets (of which one in the anterior-third is the strongest), and slightly-oblique transverse threads (nearly as stout as the largest of the spirals); the intersection of the spiral and transverse threads produce rhombic pits, within which are a few spiral striæ; the largest spiral riblet is delicately granulated at the intersections with the transverse threads. The body-whorl has a gemmulated keel, the medial portion of the upper surface has two

gemmulated ribs of about equal magnitude, at the suture there is a double smaller rib, and there is a finer one posterior to the periphery. The transverse riblets of the penultimate whorl with increasing revolution of the whorls become more slender and closer together, and thus the fenestrated ornament is somewhat obscured on the front part of the body-whorl. Below the periphery there are about five revolving equal-sized ribs, more or less gemmulated at the intersections of transverse sigmoidal threads, the one margining the umbilicus most conspicuously so. The umbilical wall has about five flat threads crossed by lamella-like striæ.

Dimensions.—Height, 1·75; basal diameters, 4·25; and 5 *(vix)*; major diameter of umbilicus, 2·5 *(vix)*.

Localities.—Three dead shells, Aldinga Bay and Semaphore.

Affinity.—The conspicuous oblique ribbing and very wide umbilicus are characters which separate this species from the majority of its congeners. Its near allies are *T. aspera* and *T. fenestrata*, but it is flatter than the former, and more angulated than the latter; unacquainted with either, except by Tryon's figures and descriptions, a critical comparison is not possible.

Turbo (Astralium) rutidoloma,* *spec. nov.* Pl. i., fig. 9.

Shell lenticular-conoid, about equally sloping above and below from the angular periphery; whorls four and a-half, flat, the embryonic one and a-half whorls fimbriated at the suture; umbilicus minute. Operculum as in *T. aureus*.

Upper-surface of body-whorl with a stout and a broad lira next the suture, which is transversely crenulate-ridged; periphery bluntly angled by a slightly compressed convex keel, which is obsoletely crenulated; between the keel and the sutural band are three granulose liræ about equidistant and equal-sized but the anterior one is close to the keel (in senile specimens a small lira is interposed next the suture, and there is a tendency in the granules of the liræ to become somewhat confluent); the intervals between the liræ are smooth. The base has four granulose liræ; the umbilical region is bounded by a broad ridge, which is broken-up into claviform tubercles obliquely disposed.

Colour greenish-brown in living specimens, flesh-coloured with rufous liræ and darker-tinted at the suture and keel in beach-examples. The interior of the aperture of living examples is greenish and of a pearly lustre.

Dimensions.—Height, 7·5; basal diameters, 10·5 and 12.

Localities.—At low tides, Moonta Bay *(Messrs. Maughan and McDougall)*; in eight fathoms, Hardwicke Bay *(Dr. Verco)*.

---

* In allusion to the wrinkled border at the anterior suture.

Affinity.—This species has a general resemblance to *Astralium aureum*, but is more depressed, umbilicated, and has a different ornamentation and coloration.

Clanculus consobrinus, *spec. nov.* Pl. i., figs. 1, 1a.

Shell perforate, depressed, pinkish-brown, sparsely black-dotted. Spire low-conic, apex acute; whorls five, suture subcanaliculate; body-whorl obtusely bi-angular at the periphery, base somewhat convex. Aperture rounded, oblique; outer and basal margins lirate-dentate. Columella oblique, neither tortuous above nor entering the umbilicus; its front edge plain, except a tooth at the base. Umbilicus wide and deep, its margin crenate-dentate.

Ornament of penultimate whorl of four equal and equidistant granulose liræ, and obliquely-transverse raised threads; of the body-whorl, a small granulose lira interposed between the third and fourth, anterior to the fourth are two smaller equally-distant from one another, the fifth is slightly granulose, whilst the sixth, which is at the periphery, is broad and obtuse; the interspaces between the liræ are faintly spirally striate; base with seven concentric liræ, the inner ones subgranose, the outer ones plain, with a few coincident striæ in the interspaces.

Dimensions.—Height, 8; basal diameters, 14 and 12 mm.

Localities.—Cast-up: Holdfast and Aldinga Bays, S. Yorke Peninsula; Head of Great Australian Bight (several examples). Dead shells dredged in Yankilla Bay, Backstairs Passage, and Corney Point in 30 fathoms *(Dr. Verco).*

Affinity.—This species has the form of *C. plebeius*, but I cannot attach it to any of its recognisable varieties or to any described congener. It is slightly more depressed than *C. plebeius*, whilst it attains nearly twice the size; the umbilicus is deeper, reaching to or beyond the junction of the penultimate and last whorls. The absence of the trenchant tessellated sculpture and the equidistant granular liræ of the posterior area of the body-whorls are distinctive characters, which are furnished by the ornament.

Clanculus euchelioides, *spec. nov.* Pl. i., fig. 8.

Shell turbinately concoid, somewhat solid, opaque, concolorous (reddish); whorls about six, the ordinary spire-whorls separated by a canaliculate suture and flattened posteriorly, the last whorl convex in the anterior-third; base flatly convex, falsely umbilicated, the columella entering the umbilical depression, which is shallow and moderately narrow. Aperture oblique, rhomboid-oval; outer lip slightly depressed at the suture; outer and basal margins thin, lirate, and iridescent within (the liræ not extending to the margin). Columella oblique, straight, rib-like, with an attenuated keel elevated into a tooth-like prominence at the base, and separated from the basal margin of the aperture by a deep

notch. (Immature shells are without the columella-characters). Operculum multispiral.

Ornament of early spire-whorls consisting of three plain cinguli, the posterior one smaller than the others ; of penultimate whorl with a riblet between anterior suture and first cingulus, between first and second, and second and third cinguli ; of last whorl with seven cinguli on the upper-surface and interposed riblet here and there, base with seven cinguli, with an interposed riblet in the one or two exterior sulci; there is no conspicuous rib margining the umbilical area. The whole surface of the shell (except apical whorls) is sculptured with fine close oblique striæ, which pass over the principal cinguli, which occasionally show a tendency to granulation.

Dimensions of a large specimen :—Height, 6·25 ; basal diameters, 5·75 and 6·5.

Localities.—Living at low tide-mark, under stones, Moonta Bay *(MM. Maughan* and *McDougall);* off Rapid Bay Head, in 10 to 12 fms. ; off Corney Point, in 30 fms., and off Rickaby *(Dr. Verco).*

This Euchelus-like shell, which has been known to me for several years, I had thought might be immature ; but it is only recently that I have had the opportunity of studying a large suite of specimens, which permits me to alter my opinion. The simplicity of the apertural and umbilical characters combined with those afforded by the ornamentation are such as to render unnecessary a comparison with other species of the genus.

Thalotia neglecta, *spec. nov.* Pl. i., fig. 6.

I separate under the above name a shell, which has been confounded with *T. chlorostoma* with which it agrees in its arcuate and truncated columella, but is without the acutely-carinated periphery, and thus establishes a passage from *Thalotia* to the section *Odontotrochus*, though it has more of the facies of the latter than the former.

The columella, as in *T. chlorostoma*, is sharply defined by a coincident umbilical depression. The species differs by the absence of the supra-sutural carina, its slightly convex whorls, and less elevated spire.

The whorls, eight in number, have the spiral and transverse ornament, as in *T. chlorostoma.* The colour is usually brown or yellowish, spotted with white or brown-white blotches, and more or less with white and brown above the suture and on the periphery, rarely unicolorous (greenish-yellow).

Adult specimens, as shown by the thickened outer lip bevelled to a sharp edge, have been dredged in life on Troubridge Shoal, St. Vincent Gulf, in six fathoms, by Mr. Matthews. Taken abundantly, living and dead, in St. Vincent and Spencer Gulfs at various depths from 5 to 15 fathoms *(Dr. Verco).*

Dimensions.—Height, 18 ; basal diameters, 13·5 and 15.

A single specimen of what may prove to be a distinct species allied to *T. chlorostoma*, taken at Geographe Bay, W. Australia, is of a buff colour, except the red-tinged apical whorls, the oblique striæ are obsolete, and the revolving liræ are replaced by linear sulci.

Calliostoma spinulosum, *spec. nov.* Pl. i., fig. 7.

Shell small, imperforate, broadly conical, pale reddish-yellow with small white blotches ; whorls six and a-half, slightly imbricating ; base almost flat.

Ornament of penultimate whorl consisting of three spiral liræ crossed by equal-sized, stout, slightly obtuse, oblique ridges ; the interstitial pits deep, rhombic, smooth ; the points of intersection of the spirals and oblique costæ are produced into spiniform granules. The liræ diminish in size from the anterior to the posterior suture ; the oblique ridges being as stout as the median spiral. The spiral ridges on the body-whorl are increased by a slender lira interposed between the first and the second, and by a subperipheral lira nearly equal in size to the peripheral one, the two together forming a truncated sulcated keel. Base with about six concentric liræ, somewhat depressed, subacute, and showing a tendency to subgranulose, crossed by strong radial growth-lines.

Dimensions.—Height, 5 ; basal diameters, 4 and 4·5.

Locality.—Moonta Bay ; one living example received from the late Mr. McDougall.

Affinity.—This exquisite little shell is readily distinguished from all congeners, except *C. rubropunctatum*, A. Adams, by its clathrate and echinate ornament ; from that species it would seem to differ by its subimbricating whorls and fewer liræ.

Euchelus fenestratus, *spec. nov.* Pl. i., fig. 2.

Shell imperforate, oval-conic, solid, thick ; spire conical, whorls four and a-half, suture canaliculate by reason of the approximation of the infra- and supra-sutural liræ. Aperture rounded, oblique ; outer margin lirate, basal margin tuberculate. Columella concave, its margin sharp and nearly straight, furnished with a sharp tooth at the base succeeded by a deep basal notch ; the first tubercle on the basal margin is equal in size to the columellar denticle.

Ornament of strong spiral ribs decussated by less elevated oblique ribs, which cut the interstices into rhombic pits ; at the intersections the spiral ribs are subnodulose. On the penultimate whorl there are three liræ, the posterior one of which is much smaller than the others ; the latter by their prominence give the whorl a biangulate section. The body-whorl, the convexity of which is only slightly interrupted, has six liræ, of the three in

front of the periphery the posterior one is nearly as prominent as the peripheral one.

Colour white, with spots of reddish-brown on the liræ, grouped in nearly axial lines across the anterior-half of the penultimate whorl, and across the body-whorl to its base.

Dimensions.—Height, 4 ; diameter, 3·25.

Habitat.—West Australia, exact locality not known. (Three examples in my collection.)

Affinities.—In its clathrate ornament, elevated spire, and biangulated whorls, this new species resembles *E. angulatus*, Pease, *E. paupereulus*, Lischke, *E. scrobiculatus*, Souverbie, but differs from them *inter alia* by its unidentate columella. *E. instrictus*, Gould, may perhaps approach nearer, but the Australian shell has fewer liræ, and the transverse ornament is closer and finer ; and though the mouth-aperture is similar, yet the Polynesian shell is deeply umbilicate.

Euchelus pumilio, *spec. nov.* Pl. i., fig. 3.

The shells to which I give this name are closely related to those of the foregoing species, *E. fenestratus*, they differ by their more rapidly-increasing whorls, in having two stout liræ on the penultimate-whorl, five on the body-whorl, the stouter and more distant transverse riblets which, moreover, are less oblique or nearly axial in direction, and by the feebler nodosities on the liræ. The colour-spots are usually confluent on the axial riblets.

Dimensions.—Height, 3 ; diameter, 3·25.

Localities.—Fowler Bay and Head of Great Australian Bight. (Six examples in my collection.)

Euchelus vixumbilicatus, *spec. nov.* Pl. i., fig. 4.

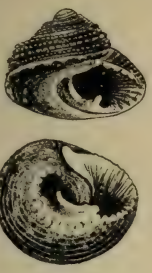
Shell similar to *E. scabriusculus*, but relatively broader and the whorls more convex. The penultimate whorl has four narrow subequal and equidistant cinguli latticed by nearly equally thick oblique costæ, which produce slight granulations on the cinguli and divide-up the surface into rhombic spaces. This open latticed ornament, though present in *E. scabriusculus*, is almost concealed by the closeness of the thick cinguli, which are densely studded with granules. There are fourteen beaded cinguli on the body-whorl between the beaded umbilical border and the suture. The colour is white, with pink spots ; but the shell has not been seen in a fresh state.

Dimensions.—Height, 5·5 ; basal diameters, 5·5 and 5.

Localities.—West coast of South Australia (many examples); Hardwicke Bay (one example); also West Australia.

Euchelus annectans, *spec. nov.*

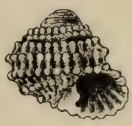
This species has the same shape as the preceding, but differs in the following particulars :—The penultimate whorl has five



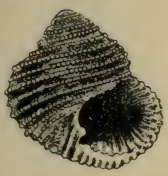
1

1ª.

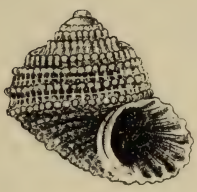
2



3



4

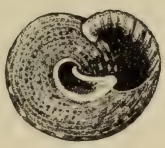


5

6

7

8

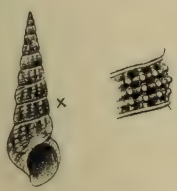


8ª.

9

10

11



12

13

13ª.

H.B. lith.

Hussey & Gillingham Lith

beaded cinguli fenestrated in the sulci ; the last whorl usually with ten cinguli ; there is no umbilicus and no prominent beaded cingulus bounding the umbilical region.

Dimensions.—Height, 5 *(vix);* basal diameters, 4 and 5.

Habitat.—West Australia ; exact locality not known (six examples).

Euchelus ampullus, *spec. nov.* Pl. i., fig. 5.

Shell globose-conic, imperforate in the young, narrowly umbilicated or reduced to a fissure in the adult ; whitish, spotted with red on the revolving ribs ; spire-whorls quadrate, separated by a linear suture ; last whorl convex, except a little flattening at the suture.

Ornament of penultimate whorl consisting of three equally thick, obtuse, and plain cinguli, separated from one another and from the sutures by nearly equal interspaces, with or without a small riblet in each interval ; all over regularly clathrate, the interstitial pits narrowly oblong. Last whorl with about eight cinguli, clathrate in the intervals ; the supra-peripheral intervals with a riblet ; the four basal cinguli granulose.

Aperture roundly oval, outer and basal margins smooth within ; columella arcuate, slightly explanulate concave, edentulous.

Dimensions.—Height, 11·5 ; basal diameters, 9·25 and 11·5.

Locality.—Probably Cambridge Gulf, N.W. Australia (several examples).

Affinity.—This species will fall into Pilsbry's Section Hybochelus. Of the four described species *E. Delpreti* is the only one with the basal diameter equal to the height ; in the others the proportion of the height to the diameter is 100 to 120–130. *E. fossulatus* has four principal liræ on the penultimate whorl. *E. mysticus* is imperforate. In *E. cancellatus* and *E. Delpreti* the number of the basal cinguli is greater than in the present species, the latter having two cinguli on the penultimate whorl.

EXPLANATIONS TO PLATE I.

Fig. 1-1*a*. Clanculus consobrinus, *Tate*. 2 x.
" 2. Euchelus fenestratus, *Tate*. 5 x.
" 3. Euchelus pumilio, *Tate*. 2 x.
" 4. Euchelus vixumbilicatus, *Tate*. 3 x.
" 5. Euchelus ampullus, *Tate*. 1·5 x.
" 6. Thalotia neglecta, *Tate*. 1·5 x.
" 7. Calliostoma spinulosum, *Tate*. 3 x and magnified ornament.
" 8-8*a*. Clanculus euchelioides, *Tate*. 3 x (vix).
" 9. Turbo rutidoloma, *Tate*. 1·5 x.
" 10. Sipho (?) mimeticus, *Tate*. 2 x.
" 11. Columbella (Mitrella) vincta, *Tate*. 2 x.
" 12. Bittium estuarinum, *Tate*. Nat. size, and magnified ornament.
" 13-13*a*. Torinia foveolata, *Tate*. 3 x.

Some Additions to the List of the Marine Gastropoda of South Australia.

By Professor Ralph Tate.

[Read June 6, 1893.]

In the recently published "Hand List of the Aquatic Mollusca inhabiting South Australia," Mr. Adcock, the compiler, has made me responsible for some specific names which are in reality only manuscript ones. In the foregoing paper I have established the major part of those names by appropriate diagnoses and figures.

Whilst the "Hand List" was passing through the press I had not the opportunity of consulting my cabinet, and as a consequence some species escaped notice; and, moreover, in the meanwhile some species have been added to the fauna through the dredging operations conducted by Dr. Verco during January of this year.

Briefly, then, this communication consists of addenda and corrigenda to the "Hand List," and the numerals in brackets prefixed to the species-names are in correspondence with those in that publication.

(3). Murex umbilicatus, *Ten.-Woods.*

Trophon umbilicatus, T.-Wds., Proc. Roy. Soc. Tasmania, for 1875, p. 135 (1870).

This species is distinct from *M. octogonus*, Q. & G., as pointed out by Mr. Brazier, an opinion with which we concur. *M. scalaris*, Adams, is an older name, but as it is preoccupied for a well-known fossil of the Piedmontese Pliocene, Tenison-Woods' name appears in substitution.

Sipho (?) mimeticus, *Tate* (ante p. 189).

(39). Latirofusus nigrofuscus, *Tate.*

Since the publication of my diagnosis and figure of the above-named species, I have examined several private collections of Tasmanian shells in Hobart and Launceston and the local collection in the Hobart Museum. In these I find the names of *Fusus Spiceri* and *F. Legrandi* indiscriminately applied; and I am not sure that I have seen the type of either. But from Woods' description, I do not hesitate to select *F. Spiceri* as the one which is synonymous with my *Latirofusus nigrofuscus*, the other shell I consider to be a young state of *Siphonalia sulcata*. The specimens received from Mr. Legrand, which were said to have

been identified by Tenison-Woods, undoubtedly belong to *L. nigrofuscus*. Had I been aware of this before publication I would have adopted Tenison-Woods' specific name. Now, the question is whether under the circumstances it should have preference. I think not, as the diagnosis, unaccompanied by a figure, is inadequate to define the species; the most important character—the plicated columella—was overlooked, though the apex is described as mammillated, a character of the highest classifactory value in the Family Fusidæ. Had Woods correctly interpreted the columella-characters, he would probably have referred the species to *Fasciolaria*, in which case it might have been recognised by his diagnosis.

(46). Cantharus rubiginosus, *Reeve.*

(74). Mitra rufocincta, *A. Adams.*

This includes (82) *Mitra vincta*, Adams (not Angas).

(83). Mitra Legrandi, *Ten.-Woods.*

(101). Ancillaria Petterdi, *nom. mut.*

A. obtusa, Petterd, Proc. Roy. Soc. Tasm. for 1885, p. 342, (1886), *non* Swainson.

A. obesula, Tate, *non* Deshayes.

(112). Columbella vincta, *Tate* (ante p. 190).

Clathurella Brenchleyi, *Angas.*

Off Corney Point in 17 fathoms, and off Rickaby in six fathoms, Spencer Gulf; Yankalilla Bay in 15 to 20 fathoms and off Rapid Head, St. Vincent Gulf *(Dr. Verco)*. Also Victoria! and N.S. Wales.

(138). Mangilia spurca, *Hinds.*

This includes (141) *Clathurella crassina*, Angas.

(152). Cancellaria purpurinaeformis, *Valc.*

By a clerical error the species name was written *paludinæformis;* (151) *C. laevigata* is probably the same.

Calyptræa pellucida, *Reeve.*

Icon. Conch., Mon., *Trochita*, t. 1., f. 2.

Dredged in life in St. Vincent and Spencer Gulfs by Dr. Verco (many examples). Also New South Wales, N. Australia, S. Papua, Phillipines.

Torcula runcinata, *B. Watson.*

Turritella runcinata, Voy. Challenger, t. 30, fig. 3, p. 475.

South Australian examples of this species agree in all details with Watson's description; but they attain to a length of 44 mm., and diametér of 13 mm.; the fissural notch is triangular

with rounded basal angles and acute apical angle, its height is 4 mm. An individual variation has the anterior carina conspicuously elevated.

Dredged in life, in 15 fathoms, in Backstairs Passage, by Dr. Verco (several examples). The "Challenger" specimens were obtained from 38 to 40 fathoms, off east Moncoeur Island, Bass-strait.

Torinia foveolata, *Tate* (ante p. 191).

(236). Bittium estuarinum, *Tate* (ante p. 190).

(228). Cerithiopsis marmorata, *Tate* (ante p. 190).

Rissoina (Phosinella) horrida, *Garrett.*

R. australis, Sowerby.

Cape Northumberland in shell-sand (one example). Also Queensland and Viti Islands.

(263). Rissoina (Phosinella) toxopleura, *(nom. mut.).*

R. lirata, Angas, *non* Gould (1861).

I have specimens from King George Sound.

Potamopyrgus niger, *Quoy* and *Gaimard.*

Paludina nigra, Voy. Astrolabe, t. 58, figs. 9-12.

An estuarine mollusc inhabitating Port Adelaide Creek, Coffin Bay; also in Tasmania; 267 is, and 268 probably, congeneric.

(299). Phasianella variegata, *Lk.*

I do not consider *P. Angasi* (300) to be specifically distinct.

(307). Astralium rutidoloma, *Tate* (ante p. 192).

(316). Clanculus consobrinus, *Tate* (ante p. 193).

Clanculus euchelioides, *Tate* (ante p. 193).

(432). Thalotia neglecta, *Tate* (ante p. 194).

Calliostoma spinulosum, *Tate* (ante, p. 195).

Calliostoma ciliaris, *Menke.*

Trochus ciliaris, Moll. Nov. Holl., p. 17 (1843); Tryon, Man. Conch., vol. XI., p. 338.

Of this, one of the largest species of the genus, measuring one inch by one and a-quarter, three living examples were dredged in Spencer Gulf by Dr. Verco. Menke records it from the north-west coast of Australia, without any particular locality.

Calliostoma australis, *Broderip.*

Tryon, op. cit., p. 348, t. 18, f. 23.

This species belongs to S.W. coast of W. Australia, but has been dredged off Normanville, St. Vincent Gulf, by Dr. Verco.

(360). Euchelus scabriusculus, *Fischer.*

Trochus scabriusculus, Fischer, Coq. Viv., p. 374, t. 114, f. 2, 1880: *Euchelus (Herpetopoma) scabriusculus*, Pilsbry, Tryon's Man. Conch., vol. XI., p. 445, t. 38, f. 12, 1889; *Euchelus Tasmanicus*, Ten.-Woods, Proc. Roy. Soc. Tasm. for 1875, p. 152 (1876).

There can be no doubt that the shell which is known to the conchologists of N.S. Wales as *E. scabriusculus* is identical with *E. Tasmanicus*. Though I must admit that the figure of it given by Pilsbry, whether original or copied from Fischer is not stated, is not much like Woods' shell, which approaches more to the figure of *E. Fischeri*. *E. Tasmanicus* has the multispiral operculum attributed by Pilsbry to *E. scabriusculus*, which uniquely represents his section *Herpetopoma*.

The question arises as to priority of name. The description given by Tenison-Woods lacks that minuteness which is essential to specific definition; Fischer's diagnosis is much more detailed, and though certain good characters are omitted, yet is worthy of acceptance. The first employment of the species-name, *scabriusculus*, is traceable to Angas in his list of N.S. Wales Marine Mollusca, P.Z.S., 1867, p. 215, where it is alluded to as a M.S.-name in Coll. Cuming by H. Adams and Angas, with the remark, "a very small species differing from *E. baccatus* in its cancellated sculpture and being umbilicated; length, 2 lines." These comparative characters are sufficient had we the two species only before us, but they are inadequate to locate the species among congeners. However, I think the best interests of conchology will be served by employing Angas' name, though perhaps a rigid application of the law of priority would require the substitution of Tenison-Woods' name.

Based upon four Tasmanian examples, I have drawn the following brief description :—The colour is ashen-reddish beneath a thin epidermis (I fail to recognise the red spots disposed in oblique lines mentioned by Ten.-Woods). There are four cinguli on the penultimate whorl, in one example a small cingulus between the third and fourth, which are larger than the other two; the last whorl has eight cinguli between the beaded umbilical border and the suture.

The S. Australian examples which I refer to, *E. scabriusculus*, have never less than five cinguli on the penultimate whorl, sometimes all equal, in others the medial one slender; on the last whorl the cinguli vary from ten to thirteen, more frequently twelve. The colour is bluish-grey to reddish-brown, whilst the beaded umbilical margin is conspicuously white.

(361) Euchelus vix-umbilicatus, *Tate* (ante p. 196).

(362) Euchelus pumilio, *Tate* (ante p. 196).

Subemarginula stellata, *A. Adams.*

Clypidina stellata, P.Z.S., 1851, p. 87 ; Reeve, Icon. Con., t. 8, f. 56 ; Tryon, Man. Conch., vol. XII., p. 283, t. 29, f. 33.

St. Vincent Gulf in shell-sand (two examples) ; also N.S. Wales.

Patella aculeata, *Reeve.*

Conch. Icon., f. 90 ; Tryon, Man. Conch., vol. XIII., p. 100, t. 62.

Rosetta Head (dead shells) ; also N.S. Wales and Tasmania.

Patella stellaeformis, *Reeve.*

Conch. Icon., figs. 48, 53 ; Tryon, *op. cit.*, p. 98, t. 17, f. 25, &c.

Rosetta Head and Fowler Bay ; also N.S. Wales to Japan.

Acmaea saccharina, *Linne.*

Var. stellaris, Quoy and Gaimard, Voy. Astrolabe, t. 71, f. 1-4.

Fowler Bay and Wallaroo Bay ; also Tasmania, and New South Wales, &c.

Acmaea Jacksoniensis, *Reeve.*

Patella, Icon. Conch., f. 127 ; Tryon, *op. cit.*, t. 42, f. 71-75.

P. Gealei, Angas, is, in my opinion, a synonym.

(405). Ischnochiton Haddoni, *Pilsbry.*

Tryon's Man. Conch., vol. XIV., p. 88, t. 22, figs. 67-73.

The Australian examples of the so-called *I. longicymba* are shown by the above-named author to differ specifically from the New Zealandian species of that name.

Ischnochiton (Ischnoradsia) australis.

Chiton australis, Sow., Mag. Nat. Hist., 1840, Conch. Illus., f. 46 ; Reeve, Con. Icon., sp. 10 ; *Lepidoradsia australis* (Sow.), Carpenter. Encounter Bay (two sps. in 1879); also Encounter Bay *(Dr. Perks)* and S Australia *(Mr. Adcock)* on the authority of Mr. Bednall.

A not uncommon shell in N.S. Wales and Tasmania.

Buccinulus affinis, *A. Adams.*

This N.S. Wales shell has occurred in a dead state at Moonta Bay.

Correlation of the Marine Tertiaries of Australia.

By Professor R. Tate and J. Dennant, F.G.S., F.C.S., Corr. Memb.

PART I., VICTORIA,

With Special Notes on the Eocene Beds at Spring Creek and at the Mouth of the Gellibrand River.

[Read May 2, 1893.]

Introduction.

During the last few years our knowledge of the marine tertiaries of Australia has been considerably advanced. New observers have entered the field, fresh localities have been explored, and, most important of all, some members of the series not previously known to exist on this continent have been discovered. The various beds, although not yet exhaustively searched, have yielded an exceedingly extensive suite of fossils, quite sufficient to enable geologists to come to definite conclusions concerning their relative age.

The marine tertiaries of the southern colonies belong to three distinct epochs, and adopting Lyell's method of classifying such beds, viz., by the percentage of living species they contain, the terms Eocene, Miocene, and Pliocene are as applicable to them as to the tertiary series of the Northern Hemisphere. In Europe, as is well known, a fourth subdivision, viz., the Oligocene, has been intercalated between the Eocene and the Miocene, but, so far, no beds are known in Australia which can be at all regarded as bridging over the gap between these two well-marked groups.

Extended observations have convinced us that not only all the tertiary beds hitherto called Oligocene, but also *all* those classed as Miocene by the Geological Survey of Victoria, must certainly be referred to the Eocene. These so-called Miocene beds consist usually of hard polyzoal limestones, in which, with the exception of casts of echinoderms, a few lamellibranchs and brachiopods, the identifiable fossils are comparatively scarce. By the early geologists they were said to overlie certain arenaceous and argillaceous deposits, rich in fossil remains, of supposed Oligocene or Eocene age, and were therefore assigned to a younger epoch. Our observations lead us to conclude that this order of deposition

is not invariable. According to Messrs. Hall and Pritchard, the reverse is the sequence in the Geelong district. As a fact, the fossil evidence indicates a close relationship between the two sets of strata, and we class them both as Eocene.

The recognition, a few years ago, both in Victoria and South Australia, of deposits of undoubted Miocene age, but of quite different lithological character to the prevailing calciferous rocks mentioned, supplied fresh data for the classification of the tertiaries. They invariably overlie both the so-called Oligocene and the calciferous rocks, and are usually demarked off by an eroded surface, while the general facies of their molluscan fauna, as well as the percentage of living species represented, definitely fixes their geological horizon. They are succeeded in South Australia by fossiliferous strata provisionally referred to the Older Pliocene. In Victoria the latter are wanting, but a younger member of the same group is known, and the tertiary series is thus fairly complete. If, then, the middle member of the series be Miocene, how can the inferior one, with its very much smaller percentage of recent species, be placed on the same horizon?

Compared with the Eocene, the marine Miocene and Pliocene are of limited development, the great mass of our tertiaries belonging to the oldest of the three periods. In fact, it requires careful search to recognise them at all, and they were evidently overlooked by the pioneer geologists. This is the only feasible explanation of the serious blunder committed in referring nearly all our wide-spread tertiary deposits to the Miocene period.

In support of the opinions here expressed, it will be necessary to refer briefly to the chief outcrops of the marine tertiaries in Victoria and South Australia, beginning with the Eocene. Details will be given only when the beds have not previously been described; for the rest the original papers may be consulted.

EOCENE.

The rocks of this period commence at the Snowy River, in the east of Victoria, and extend with numerous breaks along the south coast to beyond the westerly boundary of South Australia; they are also visible inland at various localities in both colonies, and appear as outliers of limited mass on the north-west coast of Tasmania.*

The sections in Victoria already described are :—

Mitchell River, Bairnsdale;† Moorabool and Barwon Rivers;‡

---

* *Vide* Trans. Roy. Soc. N.S.W., vol. XXII., 1888.

* Reports of Progress, Nos. 2 and 4 Geol. Survey of Victoria; Roy. Soc. of Vic., vol. III., 1891.

† Ibid, vol. IV., 1892.

Muddy Creek *(lower beds)*:* Portland, Glenelg River, and Apsley.†

1. Mitchell River, Geelong, Muddy Creek, &c.

The sections of the Mitchell river-cliffs are interesting, because both the calciferous rock and the arenaceous beds are found in close proximity, the one showing principally casts in limestone of fossil shells, and the other yielding numerous species of univalves and bivalves in an excellent state of preservation. That the difference is simply one of sedimentation and not of geological age is here abundantly plain. Certainly every species recognisable in the hard rock has also been collected in the underlying softer beds. To the south-east, on the margin of the Gippsland Lakes, and elsewhere in the vicinity, the true Miocence makes its appearance, resting against the basal part of the eroded escarpment of the forementioned Eocene cliffs.

Diagram sections, showing very clearly the stratigraphical relations of these two sets of strata, are given by Mr. Howitt in his Reports.

In comparing the results of their observations in the Geelong District with those made by us at Muddy Creek and on the Murray Cliffs, Messrs. Hall and Pritchard remark :—"The evidence we have adduced shows that in this locality as well, the sequence of the beds, as might have been expected, is similar. The deposit at Orphanage Hill, and consequently its extension up the valley of the river, is usually spoken of as Oligocene, though coloured Miocene in the quarter sheet ; while the Waurn Ponds rock, which, like the Batesford limestone, is a true polyzoal rock, is called Miocene. This is, however, a reversal of the true sequence, for the limestone is undoubtedly the underlying member of the series."

Regarding the Muddy Creek lower beds but little has to be added to what has been already recorded. The number of species has been slightly increased, and though much yet remains to be done, progress has been made in the systematic revision of the gasteropoda. Out of a total of 725 species of all classes from the two well-marked zones at Muddy Creek, 511 have been definitely traced to the lower beds. Of these, from six to eight still survive, and the percentage of recent to extinct forms is thus about one and a half. Independently of the small percentage of living species, the facies of the fauna is strikingly Eocene, and is in marked contrast to that of the overlying Miocene beds. It is significant, that of the total number of species recorded from the lower zone, only about 5 per cent. pass

* Roy. Soc. of S.A., vol. XI.

† Trans Austr. Assoc. Adv. of Science, Melb., 1890.

up into the higher, though in the former 511 and in the latter 205 species have been recognised.

Referring to the Foraminifera of the Lower Beds, Mr. Howchin remarks:—"The occurrence of *Nummulites variolaria* in very great numbers in the Lower Bed is of special interest as showing uniformity of palæontological features between the Older Tertiaries of Australia and rocks of a like age in Europe."*

2. Spring Creek.

These beds were described and mapped many years ago by the late Messrs. Wilkinson and Richard Daintree, when they were members of the Victorian Geological Survey staff. Their original report is now out of print, but extracts containing the major part of it were given by the late Prof. Martin Duncan in his description of the corals of the Australian tertiaries.† The locality was again reported on, but more generally, by Mr. F. M. Krause, in 1873. The survey of the country by these gentlemen occupied some months, and as there were no roads, and few if any inhabitants, they had difficulties to contend with which by the progress of settlement are now entirely removed.

It will be found as we proceed that the reading of the Spring Creek beds offered by us differs materially from that given in the Survey Reports. That these, as well as other tertiary sections, were misunderstood by the first observers we attribute, not so much to errors of observation, as to hasty generalisations on slender palæontological data. In the first place it was assumed that the main mass of our tertiaries was Miocene instead of Eocene. When their explorations were made, though the number of fossils collected was large, very few were identified—indeed, it is only within the last few years that the work of comparing and naming them has been systematically carried out. The attempt, therefore, to fix the horizon of the beds before analysing their fossil contents was, it must be admitted, contrary to the usual practice of geologists. As a fact, the percentage system could not be applied, and the principle of classification relied on seems to have been the resemblance of a few shells to some in the European tertiaries; whilst no account seems to have been taken of the generic grouping, which is so distinctive of the Eocene-fauna in comparison with that of the Miocene, and is, moreover, largely cosmopolitan in its distribution.

Of twenty-seven species of mollusca from strata on the same horizon as those now treated of, descriptions of which have been published by the Victorian Geological Survey, thirteen are

*Roy. Soc. of South Australia, vol. XII.

† Fossil corals (Madreporaria) of the Australian Tertiary deposits; Q. J. G. S., vol. 26, 1870.

admittedly unlike any others, fossil or recent, and thus cannot serve for comparison. For the remainder, close analogies are claimed with shells in the European tertiaries, viz., seven with Eocene, one with Oligocene, five with Miocene, and one with Pliocene forms. Even in this short list of fossils the balance is if anything favourable to the Eocene rather than to the Miocene, though with the extremely rich fauna of our tertiaries a decision either way was at the time necessarily premature.

In the second place, the beds at Spring Creek were divided into upper, middle, and lower Miocene. Waiving for a moment the question as to their being Miocene at all, we conclude, after a careful study of the section, that there is no evidence to justify a tripartite division of the strata, except that afforded by lithological differences. Sections of great thickness, and as a whole rich in organic remains, do usually show a diminution in the numbers of fossils, both specifically and individually, as they are traced to higher levels; but it does not necessarily follow that there is a palæontological break between the upper and lower portions. In the original memoir a distinction was made between beds containing bivalves and others underlying them containing chiefly univalves. *This distinction does not exist.*

The upper portions of the cliffs are, it is true, not easily accessible; but huge fallen masses detached from near the top have yielded numerous fossils, whilst intermediate portions are brought within range of observation in consequence of their dip. Those at the bottom are, as might be expected, the best preserved, and even 20 or 30 feet up many of the most fragile shells have perished, strong bivalves, such as *Pectunculus*, *Cardita*, *Limopsis*, *Cucullæa*, *Chione*, &c., chiefly weathering out on the face. From this circumstance has arisen the mistake that separate geological horizons are represented at different heights. The bivalves, brachiopods, and echinoderms supposed to be characteristic of the upper zones are also found at the base of the section, while the univalves, as *Typhis*, *Murex*, *Voluta*, *Cancellaria*, &c., are by no means confined to the lowest strata, but may be collected not only in the fallen masses referred to, but also as high up the cliffs as it is possible to reach, though in the latter position more or less decomposed, and in diminished numbers.

According to the Survey, the univalves are at the base of the section; then come the bivalves, and at the top the brachiopods and echinoderms. Now, at the northern end of the section the dip of the strata actually brings a well-marked bivalve-band down below sea-level, and it passes out of sight; while *above* it the univalves exist in greater profusion than in any other portion of the whole exposure! Again, on the southern side the polyzoal

rock full of echinoderms is at the base of the cliff, while actually resting *upon* it are strata containing the bivalves which are supposed to characterise the middle division! The fact is that the section throughout contains practically the same fossils, and the difference in the relative proportion of univalves, bivalves, brachiopods, or echinoderms present may be due to such causes as change in the sediments, and probably to certain portions of the strata representing a deeper sea deposit than the rest.

In general the polyzoal limestone is the chief repository of the echinoids and palliobranchs; the lamellibranchs are represented by species of *Ostrea*, *Pecten*, and others whose test is calcitic, the greater number of species of the class being known only as casts. The clays are rich in gastropods, the lamellibranchs are fairly-well represented, whilst palliobranchs are uncommon, and echinoids rarely present. The high state of evolution of the higher gastropods, *e.g.*, *Murex*, *Fusus*, *Triton*, *Peristernia*, *Voluta*, *Mitra*, &c., imparts to each chief locality a complexion of its own, and increases the difficulty of correlating widely separated fossiliferous clays; this phenomenon may be attributed to a degree of isolation of the different areas greater than that which obtains to-day in approximately the same areas, or it may be due to climatic effects pertaining to different oceanic currents.

The fossil-bearing cliffs commence about a mile from the mouth of Spring Creek—at Bird Rock, a small outlier of the adjoining cliff. This is a landmark well known to geologists, though quite insignificant to the ordinary visitor. It is connected with the mainland at low tide only, a circumstance which was forcibly impressed upon us more than once, when we had to wait for hours for the sea to subside between us and the fossil treasures we expected to obtain on its sides. The difficulty of getting to Bird Rock is not the only one which besets the geologist, who does not carefully time his visits with the ebb of the tide. The cliff opposite, which protrudes as to a point, cannot be rounded long after the turn of the tide, and there is no other passage to the coast beyond. Even if this point is passed there is a second formidable one a little farther on, and beyond that still another; while to be caught by the rising tide between any of these points would be extremely dangerous, for the cliffs are too abrupt to be scaled. Beyond the third point there is certainly a haven, which we were always glad to reach, and where, though close prisoners till the waters fell again, we spent many profitable hours.

The lower part of the cliff opposite Bird Rock is hollowed out into caves by the action of the waves, the strata being soft. Both in the caves and on Bird Rock itself small shells can be easily picked out with a penknife; with patience, many varieties of univalves may be collected, and generally in a good state of preservation.

Bird Rock is topped by a thin stratum of hard material corresponding with a projecting ledge on the adjoining cliff. This serves to mark the dip very clearly, which was found to be 6° to the north.

From Bird Rock, the coast curves round to the north-east, and the strata become very hard and rough, in which only fragments of fossils appear. The dip of this rugged limestone cannot be very accurately taken, but appears horizontal when viewed from the beach. At one place, however, where the cliff is cut back, the true dip is seen; it is approximately 10° to the N.N.W.

A few yards to the east of Bird Rock, a narrow flat reef is visible at low tide, commencing at the shore line and stretching fully 150 yards out to sea, not however, in a straight line, but with a gentle curve westward, as if forming a section of a large circle. Near its shore-end the dip is to the north, but this gradually changes until at the seaward extremity it is to the east. The rock is very hard, but is gradually wearing away by the formation of pot-holes on its surface. The reef is a continuation of the topmost stratum of Bird Rock, the intervening portions having been degraded. On the adjoining landward cliff, the corresponding hard band previously mentioned stands out from the inferior and superior softer strata and is continuous right to the edge of the flat rock, which is in reality a seaward extension of it. At very low tide, small sections of two outer circles also show, representing hard bands still higher up the cliff.

Along the coast in a south-westerly direction from Bird Rock, similar extensions of the cliff-strata rise at intervals from a few inches to a foot or more above low watermark, but they are mainly parallel to the coast, and stretch only a short distance seaward.

About half a mile to the south-west of Bird Rock, however, and close to the ledge in the cliffs which served as our retreat at high tide, a spit runs out for some distance and curves in an opposite direction to that on the north-east. The dip is here to the south-east and the same direction is maintained on a flat reef close to Rocky Point. The section is thus evidently a hemi-dome, the rocks in the middle inclining seawards, *i.e.*, to the east, and those on the sides to the north and south-east respectively. The strata slope more gently on the southern flank of the dome than on the northern. Exact measurements of the dip in the former direction are difficult to obtain, but it does not probably exceed three or four degrees. In the centre of the section the rocks for a short distance are apparently horizontal. The general contour of the coast in the neighbourhood of Bird Rock is well-illustrated in a lithograph copied from a photograph by the late Mr. R. Daintree, and published in the Geological Quarter-sheet, No. 28, S.E.

We did not observe any signs of disturbance in the strata, and the forces which have raised them from the bed of the sea must have operated very gradually. The tertiary strata of Australia have, as a rule, a very small inclination, and many are horizontal. There are exceptions, as at Longford, near Sale, where an Eocene limestone, full of fossils, is inclined at a high angle.

According to aneroid measurements, the highest cliff in the Spring Creek strata is 220 feet above sea-level. This is in Half Moon Bay, and is probably the summit of the hemi-dome. For about half the distance up, the usual fossils show, chiefly in bands, where they are very thick; *Pectunculus laticostatus*, *Chione Pritchardi*, *Cardita polynema* and a few other strong bivalves especially weathering out. Their predominance here has given rise to the erroneous theory, previously alluded to, that there is a separate zone of bivalves above, and another of univalves beneath. That this is not the case we proved by examining these bands where the dip brought them within reach, as univalves and other fossils supposed to be peculiar to the lower zone were plentifully mixed with the bivalves.

In the underlying softer strata the whole series was also represented—univalves, bivalves, brachiopods, polyzoa, echinoderms and corals. The remaining half of the cliff consists of red and yellowish sandy clays, with bands of hard rock. Owing to a landslip close at hand the topmost portion of these clays are accessible. At first sight they appear unfossiliferous, but on a closer examination fragments of shells, with occasionally a whole specimen, can be found scattered very sparingly among them In a two-hours' search the following were collected, chiefly on the surface of the reddish strata:—(whole shells) *Entalis Mantelli*, *Cardita delicatula*, *Limopsis Belcheri*, *Pecten Foulcheri;* (fragments) *Voluta sp.*, *Turritella sp.*, *Cytherea* or *Chione sp.*, *Cardita polynema (?)*. Our attention was first drawn to the probably fossiliferous character of these clays by information obligingly furnished by Mr. Mulder, that he had found fossils in some clays about half-way up a steep bank thirty yards north of Bird Rock, and which he supposed had fallen from above. The following fossils were found on the spot indicated by Mr. Mulder: —*Murex n. sp.*, *Peristernia lintea*, *(?) Voluta sp.*, *Ancillaria heberæ*, *A. ligata*, *Pleurotoma sp.*, *Turritella Murrayana*, *Entalis Mantelli*, *E. subfissura*, *Limopsis Belcheri*, *Pecten Foulcheri.*

In the lower of the two subdivisions of the cliff section the sediments consist mainly of soft, brown, calcareous sandstones, which not infrequently pass into hard rock. At the base of the cliff they have a dark-bluish color, which changes to a reddish-brown higher up, the first band of bivalves forming roughly a dividing line. The blue sands occur only below high-tide mark,

and even there they are turning red in places. The red color is of course simply due to the reduction of the iron in the sediments from the state of *glauconite* to a higher state of oxidation by the atmosphere, where they are not kept moist by the tide waters. It should be noted that the strata are remarkably dry, not a drop of water trickling down on any part of the cliffs.

A thin layer of ironstone is found coating some of the fallen boulders, as well as some of the rocks still *in situ*. The iron carbonate of the strata has been converted into oxide, and has segregated or blistered out at the surface. This segregation of iron-oxide, though perhaps difficult to explain, is not uncommon. Without pursuing the subject further in this paper, we may instance the red sands of Arabia, which were found by Mr. J. A. Phillip to be coated with iron in a similar manner. According to his analyses, the iron in the external coating of the grains almost equalled the total amount contained in them.*

Incidentally, reference has been made to the rugged limestones to the north-east of Bird Rock. Not only do they appear there, and also at the mouth of Spring Creek, but they crop-out again on the southern slope of the dome at Rocky Point, and continue on still farther to the south-west. They are full of polyzoal and coral remains, and contain also echinoderms, brachiopods and fragments of pectens. They are most unpromising-looking rocks, and by all previous observers have, we believe, been regarded as the topmost layer of the fossiliferous strata. From their commencement at Spring Creek they continue with a slight interruption to within a short distance of Bird Rock, when the cliffs almost suddenly change their character and become rich in gasteropods and lamellibranchs. The actual junction of the two sets of strata is concealed by fallen masses of clay, which cover the face of the cliff. On the southern slope, as previously stated, the echinoderm-rock underlies strata containing the usual bivalves, but sparingly distributed. This rock, though softer and less rugged than the polyzoal limestone on either flank of the dome, certainly represents it. The latter was followed step by step from Rocky Point in a north-easterly direction until the bivalves showed a good way up on the cliffs. A few yards farther on the strata had assumed the usual appearance, with bands of bivalves, &c., and this was maintained until the polyzoal rock was again encountered on the other side of Bird Rock. Judging, however, from some fallen boulders on the beach a little to the south of the middle of the section, certain portions of the more elevated strata, while not devoid of gasteropods, &c., evidently contain more than the usual proportion of echinoderms and

---

* Q. J. S. S., vol. XXXVIII., p. 112.

brachiopods, but it is doubtful whether these indicate a continuation of the echinoderm-rock observed at sea-level nearer the Point. The true explanation probably is, that there is a gradual passage of the one kind of rock into the other, the changes in the relative proportions of gasteropods and lamellibranchs to echinoderms, brachiopods, &c., being dependent upon conditions already alluded to.

The base of the tertiary strata is not visible in the neighbourhood of Spring Creek. Mesozoic rocks make their appearance at Point Castries, about 20 miles to the west, and continue thence over a wide area. They also crop out on the north, at Mount Moriac, about 12 miles distant.

At the Eagle's Nest, near Airey's Inlet, strata containing echinoderms and brachiopods of the same species as those from Spring Creek, and therefore, also of Eocene age, are underlain by the "Older Basalt" of the colony. The outcrop there is described by the Survey as a black sub-columnar rock, and as probably analogous to the Western Port basalt.

This basalt rests directly upon Mesozoic strata at San Remo, on the eastern shore of Western Port, while at Flinders, on the west, it is overlain by the Eocene tertiary. The "Older Basalt" is commonly called Miocene, because the strata overlying it were assumed to belong to that period. Instead of such being the case, they are, as we have endeavoured to prove, of Eocene age, and the epoch of the basalt must be correspondingly altered. It cannot be younger than Eocene, and may ultimately prove to be Cretaceous.

3. Gellibrand.

The deposits generally known as the "Gellibrand-beds" are, nevertheless, actually situated on the coast, east and west of the river's mouth. The village of Princetown, 12 miles east of Port Campbell, is a convenient centre to work from.

The cliffs on this part of the coast are so precipitous, that the beach is accessible only in a few places. Towards Princetown the slope is more gradual, but the dense undergrowth and the broken character of the ground make the descent very difficult. Fortunately, steps have been cut, and a rude kind of ladder made by Dr. Curdie, a former settler, quite close to the fossiliferous banks, and they can be reached with comparative ease.

The most interesting section is about three miles west of the Gellibrand, and is apparently the same as that described by the Survey in the report already referred to. In that report the deposit is called Miocene, but in more recent publications of the Survey this is altered to Oligocene. As before intimated, wherever the latter term is used, the Lower Tertiary or Eocene beds are indicated.

Briefly, the section may be described thus:—Blue clay from 80 to 90 feet thick, highly fossiliferous; yellowish clay 20 to 30 feet; and above this about 40 feet of recent calcareous sandstone of æolian origin. The upper part of the blue clay is turned yellow in places by drippings from above.

The easiest method of getting fossils in the blue clay is to look closely for those that have weathered out, either wholly or partially, from the face. Occasionally, the cliffs have weathered down so much that mounds of clay only are left; on the surface of these, small shells are abundant. It requires very hard work and great patience to unearth fossils with the pick, though sometimes fine specimens are thus obtained. On our first visit we made a large collection without much trouble, the shells weathered out on the cliffs and clay-mounds for many years evidently falling to us. On returning a year later, we were unable to increase our stock much, the interval being too short for another crop to weather out.

The amount of dip in the strata is, according to the Survey, 5°; we made it 4°, which is not a wide divergence in this kind of rock. But in regard to the *direction* of the dip, there is a marked disagreement betwen the observations, not only here, but also at another special section to the eastward. As certain conclusions formed concerning the tertiary deposits of this area depend in a great measure upon the direction in which the strata incline, it will be necessary to enter into details.

Speaking of the section just described, the Survey Report says:—"The section is taken nearly at the apex of an anticlinal curve of the strata, which now dip N.W. at 5° for nearly a mile, when they become nearly horizontal. . . . . From here the strata gently undulate until within a short distance of Curdie's Inlet, when they dip to the west and disappear at sea level. . . . . At Port Campbell the cliffs . . . . dip S.W. at 5°; they contain very few fossils. They exhibit numerous faults in the cliff section; in the short distance of a mile I observed five or six of them."

The dip here given is approximately in the direction of the coast line, and, if correct, the beds would of course fall to sea-level, and pass out of sight; to account, therefore, for their repeated reappearance on the coast further west, as near the Sherbrook River and other places, there must either be faults in the strata or a series of anticlines and synclines. Instead of the dip at this section being north-west, we make it W. 12° S., *i.e.*, almost to seaward. At the other section referred to, a similar dip was observed, both in direction and amount, though, according to the survey, it changes to the east. When the real direction of the dip, viz., west by south, is recognised, there is no

difficulty in reading the sections right along the coast from the mouth of the Gellibrand to Curdie's Steps, on to the Sherbrook River, and thence to Port Campbell, the most westerly point we examined.

As before said, the inclination of the beds is approximately seaward, the general trend of this somewhat broken coast being to the north-west. The strata, therefore, appear horizontal whenever a cliff happens to be cut at right angles to the dip, and seem to rise or fall according as the coast line changes in direction slightly towards the north or west. There is certainly no evidence of disturbance here any more than there is in similar strata in more westerly areas, where the beds are practically horizontal. In order to bring the same beds again into view at Camperdown, Muddy Creek, &c., at comparatively low elevations, we must adopt the reasonable theory that there are long undulations, or rolls, in the strata, altogether unrecognisable in a single outcrop. (See pl. 2.)

The second or more eastward section mentioned is about half a mile from the river mouth, and just opposite Bowker's Hotel, in the village of Princetown. It is only about four feet thick, and is raised above the beach from 30 to 40 feet, the underlying portion being hidden by masses of recent dune-limestone fallen from above. The strata consist of hard sandy rock, much impregnated with iron. There is also a layer of ironstone pebbles firmly cemented together, resembling in appearance the bog iron ore on a swamp bottom. It is possible that the ironstone is actually *in situ*, and has been formed by the percolation of water containing iron in solution through the strata.

By the Survey the section is called Miocene, and is supposed to represent strata overlying the blue clays at Curdie's Steps. The evidence relied on to establish this sequence is, mainly, the direction of the dip in the two sections, but the observations made were, as we have shown, erroneous.

Very few fossils can be extracted from such strata, but among them we noticed *Pecten semilaevis* and other pectens, *Spondylus gaederopoides*, Echinoderms, and Polyzoa characteristic forms of the Eocene, but unrecognised, or very sparingly so, in the Miocene, and we conclude, therefore, that just as at Spring Creek, the former group is the only one present in the marine tertiaries of the Gellibrand.

East of the river we found but few fossils, and none in the blue clays. About a mile and a half from the mouth, Mesozic sandstones emerge from beneath the Eocene strata, but it is doubtful whether they extend much further westward. What formation underlies the coast tertiaries in that direction is unknown, as, from Gellibrand to the border of the colony, and

far on into South Australia, the outcropping strata consist of the same, or still younger, rocks.

A list of the fossils collected is given in the appendix. With few exceptions, they are identical with those from Muddy Creek *(lower bed)*. On the Geological Map of Victoria, the blue clays are marked as Oligocene (Eocene), and bracketed with the Mornington beds, which they closely resemble.

4. Bullen Merri and Gnotuk Lakes.

In the volcanic country around Camperdown these lakes form prominent and very interesting features. They are situated in a deep hollow, with steep banks leading down to the water's edge. A narrow ridge, not more than 20 feet at the lowest part above the surface of Bullen Merri, though very much more than that above Gnotuk, separates the two lakes.

Both on the shores, and for some distance up the banks of Lake Bullen Merri, the only one we visited, fossil shells are fairly plentiful. When we were there the supply was more limited than usual, as one of our party had picked up all he could find a few days before. However, as he submitted them to our inspection shortly afterwards, we decided to forgive him. We are indebted to the same gentleman for a collection of shells from Gnotuk. From the latter only 39 species were obtained, but from Bullin Merri the number recorded is 104. Of the Gnotuk species, 14 are absent from the Bullin Merri gatherings, so that the actual total amounts to 116. By reference to the tabulated list of species appended, it will be seen that the deposit belongs to the Muddy Creek *(lower beds)* and Gellibrand types. Its elevation is—for Gnotuk 391 feet, and for Bullin Merri 531 feet above sea-level, the surface of the water being in the latter lake 140 feet above that in the former. For information concerning levels in the two lakes we have to thank Mr. King, the Engineer of the Shire of Hampden.

5. Warrnambool.

The recent dune-limestone is the prevailing rock at Warrnambool, and though tertiary strata were known to exist, it is only lately that fossils have been obtained. The credit of finding them belongs to Mr. A. D. Dobson, a late arrival in the town, and it is remarkable that they escaped observation so long. The fossiliferous sections commence close to the mouth of the Hopkins, and continue for a few miles up the river. The rocks consist of the well-known rugged limestones, in which the fossils, principally casts, are with difficulty extracted whole. Overlying them is the æolian limestone just mentioned, rough and jagged, like the fossil-bearing strata beneath, but easily distinguishable

by its constantly changing dip. The fossils are exceedingly scarce in the cliffs, but the following list, though a very short one, sufficiently indicates their horizon :—*Chthamalus sp.*, ? *Voluta sp.* (casts), *Pecten Foulcheri, var.*, *P. Gambierensis*, *Walhheimia insolita*, *Magasella Woodsiana*, *Lovenia Forbesi* (numerous), spines of *Cidaris sp.*, and bryozoan remains.

6. Mornington and Cheltenham.

In the Prodromus of the Palæontology of Victoria, the first of these two deposits is correctly placed at the base of the tertiary series, but to the second a most unwarrantable position is assigned, viz., in the Pliocene division. The number of species from both has been greatly increased recently, fully 400 being now recorded from Mornington, and 126 from the less prolific beds at Cheltenham. As it is intended to describe them in detail in a succeeding paper, we will merely say at present that the former is certainly Eocene, and that the latter belongs, probably, to a higher level of the same group.

MIOCENE.

The beds previously described are :—Muddy Creek (upper beds),* Jemmy's Point,† Portland and Glenelg River.‡

The number of species now definitely traced to the Upper deposit at Muddy Creek is 205, but as a large proportion of these are still undescribed, its classification, strictly on the percentage system, must be postponed. Thirteen of the species, or rather more than 6 per cent., are certainly recent, and it is probable that this number will be at least doubled by a critical examination of all the fossils. Twenty-seven species, or 13 per cent., pass down into the underlying Eocene zone; several of these are prevailing forms, spread throughout the whole series. In its general facies, the fauna of the upper zone at Muddy Creek bears a striking resemblance to that in the Jemmy's Point deposit, though in the latter the percentage of living species is much higher, reaching fully 16 per cent.

In summarising his examination of the Foraminifera of Muddy Creek, Mr. W. Howchin, F.G.S., makes the following remarks upon the distinction between the upper and lower zones at Muddy Creek :—"The stratigraphical distinction between the two beds of the section concerned is sufficiently marked from the fact that the Foraminifera common to both only amount to 28 per cent. of the whole. There is also a marked change in the general facies of the rhizopodal fauna as we pass from the lower to the upper

* Roy. Soc. of S. Austr., vol. XI.
† Roy. Soc. of Vic., vol. III., 1891.
‡ Trans. Austr. Assoc. Adv. of Science, Melbourne, 1890.

geological horizon, pointing to a shallowing of the sea bottom, which is indicated not only by the relatively larger numbers of shallow-water species in the upper beds, but these are proportionally more numerous and better developed as individuals."*

Quite a large area in the south-west of Victoria, including nearly the whole of the county of Follett and a portion of Normanby, is occupied by strata which have been tentatively included in the Miocene. The deposit is of moderate thickness, nowhere perhaps more than from 20 to 30 feet through, and from the prevalence of a species of oyster in it has been named Ostrea-limestone. This, together with two other common fossils accompanying it, belong to living species; but besides these there are casts of other shells, which can only be doubtfully determined. The three living species referred to do not occur in the Miocene strata just described, and the Ostrea-limestone is classified as Miocene chiefly on stratigraphical grounds. It overlies the Eocene calciferous rock, and was certainly deposited before the Pliocene beds to be mentioned presently At Portland its junction with the Eocene rock is very plainly seen, a pebble band, a few inches thick, separating the two. Fine sections of the Ostrea-limestone are visible on the Glenelg cliffs at Dartmoor, and the same rock has been traced through Strathdownie, and on to the Dismal Swamp, just across the border in South Australia. Lithologically, the strata consist of flaggy limestones showing much false bedding. When disintegrated, they form immense beds of sand, which become the leading feature of the country where the formation prevails. Where the rock is exposed it is often smooth, and breaks up into flat cakes of limestone, which are so thickly strewn over the ground in places as to make it difficult to drive over the roads. Possibly these blocks of stone may sometimes consist of travertine, formed by the re-deposition of carbonate of lime, which has first been dissolved out by water from the original rock; that this is not the case for all of them is certain, as they frequently contain fossil shells.

NEWER PLIOCENE.

The only marine Pliocene outcrop known in Victoria is that on the Glenelg River, at Limestone Creek, described a few years ago.† It rests upon the polyzoal rock, and from its position is evidently of later date than the Ostrea-limestone on the top of the river cliffs. The proportion of living to extinct species of mollusca present amounts to more than 80 per cent., so that it must be referred to the latter part of the Pliocene period.

* Roy. Soc. S. Aus., vol. XII.

†Roy. Soc. of Victoria, vol. XXIII., 1887; and Trans. Aust. Assoc. Adv. of Science, Melb., 1890.

The section is a very instructive one, as it throws much light upon the geological history of the Lower Glenelg, and the surrounding area, during Pleistocene and recent times. Since its deposition, hundreds of square miles of land have emerged from the ocean, through which the Glenelg has since cut a channel 120 miles long, over 100 feet deep, and from 100 yards to nearly a mile in width. Moreover, the outpouring of the sheets of lava, which cover a great part of the surface in the South-West, is probably a subsequent event; while it is certain that one entire formation, the Dune-limestone, now the most striking feature of the coast scenery, belongs to a still later period.

LIST OF FOSSILS.

The list of fossils is incomplete in the Family Pleurotomidae (as its very considerable number of species have not yet been elaborated), and in the class Polyzoa, whilst the Foraminifera are wholly omitted. The asterisk (*) in the geographical columns indicates that the occurrence is restricted.

	Spring Creek	Gellibrand	Camperdown	Muddy Creek	Mornington	Other Occurrences.
MAMMALIA.						
Squalodon Wilkinsoni, *McCoy*	*	.	.	.	.	
CEPHALOPODA.						
Aturia australis, *McCoy*	x	x	.	x	.	
Nautilus transennus, *Tate*	.	*	.	.	.	
Spirulirostra curta, *Tate*	*	.	.	.	.	
GASTROPODA.						
Typhis acanthopterus, *Tate*	.	x	x	.	x	
laciniatus, *Tate*	x	.	x	x	.	
McCoyii, *Ten.-Wds.*	x			x	.	
evaricosus, *Tate*	.			x	.	
Murex velificus, *Tate*	x	x	x	x	x	
rhysus, *Tate*	.	x	.	.	x	
lophoessus, *Tate*	.	x	x	x	x	
amblyceras, *Tate*	.	x	.	x	x	
Eyrei, *Ten.-Wds.*	x	x	.	x	x	
camplytropis, *Tate*	.	x	.	x	x	
asperulus, *Tate*	x	x	.	x	x	
prionotus, *Tate*	.	x	.	.	.	Adelaide
sublævis, *Tate*	x	.	.	.	.	Adelaide
Trophon expansilabrum, *Tate*	*	.	.	.	.	
fontinalis, *Tate*	*	.	.	.	.	
elatus, *Tate*	.	*	.	.	.	
polyphyllus, *Ten.-Wds.*	x	.	.	x	x	
Rapana aculeata, *Tate*	x	x	.	x	x	
Ranella (Argobuccinum) Prattii, *Ten.-Wds.*	.	x	.	x	x	
Triton Woodsii, *Tate*	.	x	x	x	x	
cyphus, *Tate*	.	x	.	x	x	

textilis, *Tate*	.	x	.	x	x		
annectans, *Tate*	.	x	x	x	.		
tumulosus, *Tate*	.	x	.	x	x		
tortirostris, *Tate*	x	x	x	x	x		
gemmulatus, *Tate*	.	x	.	x	x		
granoliratus, *Tate*	.	*	.	.	.		
fodinalis, *Tate*	.	*	.	.	.		
Distorsio interposita, *Tate*	*	.	.	.	.		
Epidromus tenuicostatus, *Ten.-Wds.*	.	x	.	x	.		
texturatus, *Tate* ...	.	x	.	x	x		
intertextilis, *Tate* ...	*	.	.	.	.		
Fusus foliaceus, *Tate*	.	x	.	x	x		
acanthostephes, *Tate* ...	x	x	x	x	x		
craspedotus, *Tate*	.	x	x	x	x		
senticosus, *Tate*	.	x	.	x	x		
dictyotis, *Tate*	.	x	.	x	x		
hexagonalis, *Tate*	.	x	.	x	.		
simulans, *Tate*	.	.	x	x	.		
macrorhynchus, *Tate* ...	*	.	.	.	.		
Latirofusus aciformis, *Tate* ...	.	x	.	x	x		
alternans, *Tate*	*	.	.	.	.		
Fasciolaria exilis, *Tate*	.	x	.	x	x		
cristata, *Tate*	.	x	.	x	x		
cryptoploca, *Tate* ...	.	x	.	x	.		
rugata, *Tate*	ng	x	.	x	x		
decipiens, *Tate* ...	on	x	.	x	.		
Dennanti, *Tate* ...		*	.	.	.		
Gellibrandensis, *Tate* ...	en	x	.	.	.	Fyansford	
Siphonalia dictyotis, *Tate*	st	x	.	.	.		
longirostris, *Tate* ...	x ta	x	x	x	x		
Tatei, *Cossmann* ...	hen		.	x	x		
ischna, *Tate*	ne th		.	x	.	Fyansford	
Sipho crebrigranosus, *Tate*			.	x	.		
Peristernia lintea, *Tate*	vail	x	x	x	.		
succincta, *Ten.-Wds.* ...	.	x	.	x	.		
interlineata, *Tate* ...	.	x	.	x	.		
Murrayana, *Tate* ...	.	.	x	.	.	R. Murray, Belmont	
subundulosa, *Tate* ...	.	x	.	x	.		
tenuistriata, *Tate* ...	.	*	.	.	.		
dyscrita, *Tate*	.	*	.	.	.		
crassilabrum, *Tate* ...	*	.	.	.	.		
rudis, *Tate*	*	.	.	.	.		
Tritonidea acrobeles, *Tate*	.	*	.	.	.		
Hallii, *Tate*	x	.	.	.	.		
Dennantia Ino, *Ten.-Wds.*	.	x	.	x	x		
cingulata, *Tate*	.	x	.	.	x		
tenuisculpta, *Tate* ...	.	x	.	.	.	Fyansford	
Leucozonia staminea, *Tate*	.	x	.	.	x		
Zemira precursoria, *Tate*	.	x	.	x	.		
Eburnopsis tessellatus, *Tate* ...	*	.	.	.	.		
lateliratus, *Tate* ...	.	.	x	x	.		
Phos variciferus, *Tate*	.	x	.	x	x		
Nassaria tabulata, *Tate*	*	.	.	.	.		
Nassa Tatei, *Ten.-Wds.*	x	x	.	x	x		
Lyria harpularia, *Tate*	.	x	.	x	x		
Voluta Hannafordi, *McCoy* ...	.	x	.	x	x		
McDonaldi, *Tate*	.	x	.	x	x		

limbata, *Tate*	.	x	.	.	x		
macroptera, *McCoy*	*	.	.	.	.		
acuminata, *Tate*	*	.	.	.	.		
lirata, *Johnston*	.	x	.	x	.		
pseudolirata, *Tate*	.	x	.	x	x		
strophodon, *McCoy*	.	x	x	x	x		
antiscalaris, *McCoy*... ...	.	x	x	x	x		
anticingulata, *McCoy* ...	x	.	.	.	.	Table Cape	
Weldii, *Ten.-Wds.*	.	.	x	x	.		
sp.	*	.	.	.	.		
ancilloides, *Tate*	.	x	.	x	x		
McCoyii, *Ten.-Wds.* ...	.	x	.	x	x		
sarissa, *Tate*	x	.	.	x	.		
pagodoides, *Tate*	x	.	.	.	.	Adelaide	
cathedralis, *Tate*	x	.	.	x	.		
uncifera, *Tate*	x	.	.	.	.	R. Murray	
Mitra alokiza, *Ten.-Wds.*	.	x	.	x	x		
dictua, *Ten.-Wds.*	.	x	.	x	.		
ligata, *Tate*	.	x	x	x	x		
othone, *Ten.-Wds.*	.	x	.	x	x		
atractoides, *Tate*	x	x	x	x	.		
leptalea, *Tate*	.	x	x	x	x		
exilis, *Tate*	.	x	.	x	.		
paucicostata, *Tate*	.	x	.	x	x		
biornata, *Tate*	.	x	.	x	.		
semilævis, *Tate*	.	x	x	x	x		
conoidalis, *Tate*	x	.	.	x	.		
fontinalis, *Tate*	*	.	.	.	.		
clathurella, *Tate*	.	x	.	x	.		
Marginella Winteri, *Tate*	x	.	.	x	.		
Woodsii, *Tate*	.	x	.	x	.		
propinqua, *Tate* ...	.	x	x	x	x		
Wentworthi, *Ten.-Wds.*	.	x	x	x	x		
submicula, *Tate* ...	.	x	.	x	.		
micula, *Tate*, var. ...	.	x	x	.	.	Table Cape	
strombiformis, *Ten.-Wds.*	x	x	.	.	.	Table Cape	
obconica, *Tate*	*	.	.	.	.		
globiformis, *Tate* ...	x	.	.	x	x		
cymbula, *Tate*	*	.	.	.	.		
Oliva Adelaidæ, *Tate*	x	x	x	.	.	Adelaide	
Ancillaria orycta, *Tate*	x	.	x	.	.	Cheltenham, Mioc., Gippsland	
apiculata, *Tate*	*	.	.	.	.		
hebera, *Hutton*	x	.	.	x	.		
ligata, *Tate*	x	.	x	.	.		
pseudaustralis, *Tate* ...	x	x	x	x	x		
semilævis, *Ten.-Wds.* ...	x	.	.	x	x		
Harpa lamellifera, *Tate*	.	x	.	x	.		
pachycheila, *Tate*	*	.	.	.	.		
Columbella clathrata, *Tate*... ...	.	x	.	x	.		
Cainozoica, *Ten.-Wds.*	.	x	.	x	x		
funiculata, *Ten.-Wds.* ...	.	x	x	x	x		
atratæformis, *Tate* ...	.	x	.	x	.		
curtansata, *Tate* ...	.	x	.	x	.		
nodulosa, *Tate*	.	x	.	x	.		
granosa, *Tate*	*	.	.	.	.		
lirata, *Tate*	*	.	.	.	.		
aciculata, *Tate*	.	x	.	x	x		

	crenulifera, *Tate* ...	*	.	.	.	.	
	Oxleyi, *Ten.-Wds.* ...	x	.	.	.	.	Table Cape
Cancellaria	platypleura, *Tate* ...	.	x	.	x	.	
	varicifera, *Ten.-Wds.* ..	x	x	x	x	x	
	ptychotropis, *Tate* ...	x	.	.	.	.	Adelaide
	Etheridgei, *Johnston* ...	x	.	.	.	.	Table Cape
	capillata, *Tate*	x	.	.	x	x	
	fontinalis, *Tate*... ...	*	.	.	.	.	
	lauta, *Tate*	*	.	.	.	.	
	continua, *Tate*	x	.	.	.	.	Belmont
Terebra	platyspira, *Tate*	.	x	.	x	.	
	additoides, *Ten.-Wds.* ...	x	.	.	x	.	Table Cape
	simplex, *Ten.-Wds.* ...	x	.	x	x	.	Table Cape
Cassis	exigua, *Ten.-Wds.*	.	x	.	x	.	
Semicassis	transenna, *Tate*... ...	.	x	.	x	x	
Cassidaria	gradata, *Tate*	.	x	x	x	x	
	Wilsoni, *Tate*	*	.	.	.	.	
Trichotropis	quinquelirata, *Tate* ...	*	.	.	.	.	
	apicilirata, *Tate* ...	x	.	.	.	x	
Conus	Dennanti, *Tate*	x	x	.	x	.	
	pullulescens, *Ten.-Wds.* ...	x	x	.	x	x	
	extenuatus, *Tate*	x	x	x	x	.	
	cuspidatus, *Tate*	.	x	x	x	x	
	ligatus, *Tate*	.	x	.	x	x	
	heterospira, *Tate*	.	x	.	x	x	
	acrotholoides, *Tate*	.	x	.	.	x	
Dolichotoma	angustifrons, *Tate* ...	.	x	.	x	x	
	decomposita, *Tate* ...	.	x	.	.	.	Fyansford
	asperulata, *Tate* ..	.	.	x	x	.	
	fontinalis, *Tate* ...	*	.	.	.	.	
Pleurotoma	perarata, *Tate*... ...	x	x	x	x	.	
	consutilis, *Ten.-Wds.*...	.	x	.	x	.	
	Mûrndaliana, *Ten.-Wds.*	.	x	.	x	.	
	Claræ, *Ten.-Wds.* ...	.	x	.	x	.	
	Samueli, *Ten.-Wds.* ...	.	x	.	x	.	
	paracantha, *Ten.-Wds.*	x	.	x	.	.	Table Cape
	cristulata, *Tate* ...	*	.	.	.	.	
	hemipsila, *Tate*, var. ...	x	.	.	x	.	
Drillia	integra, *Ten.-Wds.*	.	x	.	x	.	
	Johnstoni, *Ten.-Wds.* ...	x	.	.	.	.	Table Cape
	fusiformis, *Hutton*	x	.	.	.	.	
Bela	sculptilis, *Tate*, var.	x	.	.	x	.	
	Woodsii, *Tate*	x	.	.	x	.	Table Cape
	tenuisculpta, *Ten.-Wds.* ...	x	x	.	x	.	Table Cape
Mangelia	bidens, *Ten.-Wds.* ...	.	.	x	x	.	
Raphitoma	daphnelloides, *Ten.-Wds.*	x	.	.	x	.	
Daphnella	gracillima, *Ten. Wds.* ...	x	x	x	x	x	
Pusionella	hemiothone, *Ten.-Wds.*	.	x	.	x	.	
	columbelloides, *Ten.-Wds.*	x	.	.	.	.	Table Cape
Cypræa	contusa, *McCoy*	.	x	.	x	x	
	subpyrulata, *Tate*	.	x	.	x	.	
	brachypyga, *Tate*	.	x	.	x	x	
	pyrulata, *Tate*	.	x	.	x	x	
	leptorhyncha, *McCoy* ...	x	.	.	x	x	
	eximia, *G. B. Sow.*	.	x	.	x	x	
	platyrhyncha, *McCoy* ...	*	.	.	.	.	? Table Cape
	gigas, *McCoy*	x	x	.	x	x	
	platypyga, *McCoy*	.	x	.	x	x	
	dorsata, *Tate*	.	x	.	x	x	

Trivia avellanoides, *McCoy* ...	x	x	x	x	x	
Erato australis, *Tate*	x	x	.	.	.	Aldinga
Crossea semiornata, *Tate*	*	.	.	.	.	
Scalaria microrhysa, *Tate*	*	.	.	.	.	
pleiophylla, *Tate*	x	.	.	Aldinga, Corio Bay	
polynema, *Tate*	*	.	.	.	.	
orycta, *Tate*	x	.	.	x	.	
leptalea, *Tate*	.	.	*	.	.	
Natica Hamiltonensis, *Ten.-Wds.*...	x	x	.	x	x	
polita, *Ten.-Wds.*	.	x	x	x	x	
limata, *Tate*	x	.	.	x	.	
Wintlei, *Ten.-Wds.*	x	.	.	.	.	Table Cape
subNoæ, *Tate*	x	.	.	.	.	Table Cape
substolida, *Tate*	.	.	x	x	.	R. Murray
(Sigaretopsis) subinfundibulum, *Tate*	.	x	x	x	x	
Sigaretus microstira, *Tate*	*	.	.	.	.	
Calyptræa undulata, *Tate*	x	.	.	x	.	
Solarium acutum, *Ten.-Wds.* ...	.	x	.	x	.	
squamogranosum, *Tate* ...	.	x	.	x	.	
Torinia Simsoni, *Tate*	x	.	.	.	.	Table Cape
ephamilla, *Tate*	.	x	.	x	.	
Turritella Murrayana, *Tate* ...	x	x	.	x	.	
tristira, *Tate*	.	x	x	.	x	
fontinalis, *Tate*	x	.	.	.	.	Table Cape
acricula, *Tate*	.	x	x	x	.	R. Murray
septifraga, *Tate*	*	.	.	.	.	
platyspira, *Ten.-Wds.* ...	.	x	.	x	.	
Vermetus conohelix, *Ten.-Wds.* ...	x	x	.	.	.	Table Cape
Tenagodus occlusus, *Ten.-Wds.* ...	x	x	.	x	x	
Eulima Danæ, *Ten.-Wds.*	x	x	x	x	x	
arcigerens, *Tate*	.	*	.	.	.	
Niso psila, *Ten.-Wds.*	.	x	x	x	x	
Eulimella porrecta, *Tate*	x	.	.	.	.	
Leiostraca Johnstoni, *Tate*	x	.	.	x	x	
Turbonilla cylindrica, *Tate*	.	x	.	.	.	
liræcostata, *Ten.-Wds.*...	x	.	.	.	.	Table Cape
Actæopyramis olivellæformis, *Tate*	x	.	.	x	.	
Odostomia microlirata, *Johnston?* ...	x	.	.	.	.	Table Cape
leptoskeles, *Tate* ...	.	x	.	x	.	
decurtata, *Tate*	.	x	.	x	.	
Mathilda transenna, *Ten.-Wds.* ..	x	.	.	x	.	R. Murray
angulifera, *Tate*	.	x	.	x	.	
multilirata, *Tate*	.	*	.	.	.	
Cerithium cribarioides, *Ten.-Wds.*	x	x	x	x	x	
apheles, *Ten.-Wds.* ...	.	x	.	x	x	
Ataxocerithium fenestratum, *Tate*	.	x	.	x	.	
Triforis sulcata, *Ten.-Wds.*	x	.	.	x	.	
Wilkinsoni, *Ten.-Wds.* ...	.	x	.	x	x	
planulata, *Ten.-Wds.* ...	.	x	.	x	.	
Lovenella platyspira, *Tate*	x	.	.	.	.	
marginata, *Tate*	.	x	.	.	.	
accrescens, *Tate*	.	x	.	.	x	
linneata, *Tate*	.	x	.	x	.	
quinquelirata, *Tate* ...	.	x	.	.	.	
subimbricata, *Tate* ...	.	x	.	.	.	
nodulifera, *Tate*	.	x	.	.	.	
(Cinctella) ornithopetronica, *Tate*	x	.	.	x	.	

Risella alta, *Tate*	*	.	.	.	.	
Fossarus (Isapis) eothinos, *Tate* ...	*	.	.	.	.	
Rissoa (Cingula) varians, *Tate* ...	x	x	.	x	x	
Rissoina Mulderi, *Tate*	*	.	.	.	.	
platycheila, *Tate*	.	x	.	x	x	
Adeorbis marginatus, *Tate*	*	.	.	.	.	
Liotia Roblini, *Ten.-Wds.*	.	x	.	x	x	
Delphinula aster, *Tate*	.	x	.	x	x	
Astralium quadriseriale, *Tate* ...	*	.	.	.	.	
longispinum, *Tate* ...	*	.	.	.	.	
Collonia parvula, *Ten.-Wds.* ...	x	x	.	x	x	
Leptothyra fontinalis, *Tate*	x	.	.	.	.	
Cantharidus subalternans, *Tate* ...	.	x	.	x	x	
biserialis, *Tate*	.	x	.	.	.	
cavatus, *Tate*	.	x	.	x	.	
Phasianotrochus tenuisculptus, *Tate*	*	.	.	.	.	
Eumargarita strigata, *Ten.-Wds.* ...	x	.	.	x	x	
lucens, *Tate*	*	.	.	.	.	
Gibbula echinulata, *Tate*	x	x	x	.	.	
Calliostoma lithocolletum, *Tate* ...	*	.	.	.	.	
ornithopetronicum, *Tate*	*	.	.	.	.	
inornatum, *Tate* ..	*	.	.	.	.	
escharoides, *Tate* ...	x	x	.	x	.	
C. (Astele) fontinale, *Tate*	x	x	.	.	.	
seminornatum, *Tate* ...	.	.	x	x	x	
Euchelus subfenestratus, *Tate* ...	*	.	.	.	.	
Fissurellidæa laqueata, *Tate* ...	.	x	.	.	x	
malleata, *Tate* ...	.	x	.	x	.	
Emarginula aduncta, *Tate*	x	.	.	.	.	
cymbium, *Tate* ...	.	x	.	x	x	
aperturata, *Tate* ...	.	x	.	.	x	
cassida, *Tate*	.	x	.	x	x	
Subemarginula occlusa, *Tate* ...	.	x	.	x	x	
Chiton sp.	x	.	.	.	.	
Bulla scrobiculata, *Ten.-Wds.* ...	.	x	.	x	.	
Tornatella scrobiculata, *Ten.-Wds.*	x	.	.	x	x	
olivellæformis, *Tate* ...	*	.	.	.	.	
Ringicula lactea, *Johnston*	x	.	x	x	.	
Cylichna exigua, *Ten.-Wds.* ...	x	.	.	x	.	
crebrelineata, *Tate* ...	x	x	.	.	.	Fyansford
paucilineata, *Tate* ...	x	x	.	x	x	
imparistriata, *Tate* ...	.	x	x	x	.	
Volvaria sp.	x	.	.	x	.	Table Cape
Utriculus sp.	x	.	.	x	.	
SCAPHOPODA.						
Entalis annulatum, *Tate*	x	.	.	x	.	
Mantelli, *Zittel*	x	x	x	x	x	
subfissura, *Tate*	x	x	x	x	x	
Dentalium aratum, *Tate*	x	x	x	x	x	
lacteum, *Deshayes* ...	.	x	.	x	.	
bifrons, *Tate*	x	.	.	.	.	
Cadulus mucronatus, *Tate*	x	.	.	x	.	
PTEROPODA.						
Vaginella eligmostoma, *Tate* ...	.	x	.	x	x	
LAMELLIBRANCHIATA.						
Gryphæa tarda? *Hutton*	x	x	.	.	.	Aldinga
Anomia fontinalis, *Tate*	x	.	.	.	.	
Placunanomia sella, *Tate*	x	x	?	x	x	

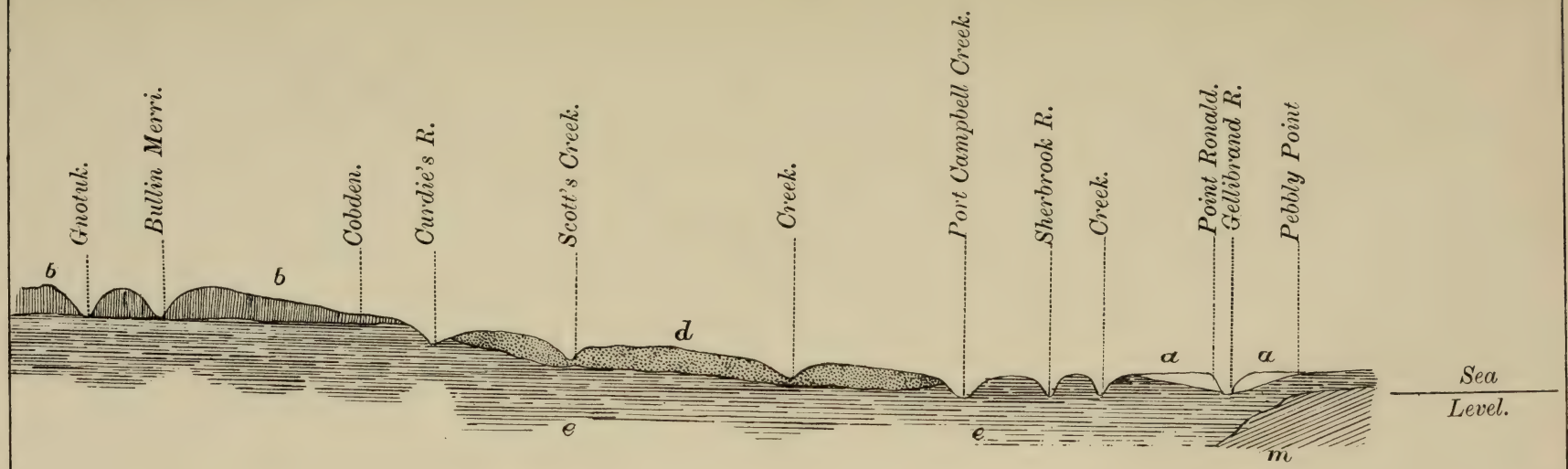
Dimya dissimilis, *Tate*	x	x	x	x	x		
Pecten consobrinus, *Tate*, var. ...	x	.	.	.	.	Aldinga	
Hochstetteri, *Zittel*	x	.	x	Aldinga, R. Murray			
Murrayensis, *Tate*	x	.	.	x	.		
Peroni (?) *Tate*	x	.	.	.	.	Aldinga	
Sturtianus, *Tate*	x	.	.	x	.		
lucens, *Tate*	x	.	R. Murray, Mioc., Aldinga				
Zitteli, *Hutton*	x	x	x	x	x		
Yahlensis, *Ten.-Wds.* ...	.	x	x	x	.		
dichotomalis, *Tate*	.	x	.	.	x		
polymorphoides, *Zittel* ...	.	x	.	x	.		
Foulcheri, *Ten.-Wds.* ...	x	.	.	x	.		
Lima Bassi, *Ten.-Wds.*	.	x	.	x	x		
Limatula Jeffreysiana, *Tate* ...	x	.	.	x	x		
polynema, *Tate*	x	.	.	.	.	Adelaide	
crebresquamata, *Tate* ...	*	.	.	.	.		
Spondylus pseudoradula, *McCoy* ...	.	x	.	x	x		
gaderopoides, *McCoy* ...	x	x	.	Mitchell R., Aldinga			
Modiola sp.	x	.	.	.	.	Aldinga	
sp.	x	.	.	.	.		
Modiolaria singularis, *Tate* ...	x	.	x	x	.		
Crenella globularis, *Tate*	x	.	.	x	x		
trapezina, *Tate*	.	x	.	x	.		
Nucula Atkinsoni, *Johnston* ...	x	x	.	x	x		
tumida, *Ten.-Wds.* ...	x	x	x	x	x		
Morundiana, *Tate*	x	.	x	x	.		
Leda apiculata, *Tate*	x	x	.	x	x		
Huttoni, *Ten.-Wds.*	.	x	x	x	x		
obolella, *Tate*	x	x	.	x	x		
vagans, *Tate*	.	x	x	x	x		
Woodsii, *Tate*	x	.	x	x	.		
embolos, *Tate*	x	.	.	.	x		
Poroleda lanceolata, *Tate*	.	*	.	.	.		
Limopsis insolita, *Sow.*	x	.	.	.	.	Aldinga	
Belcheri, *Ads. & R.* ...	x	x	x	x	x		
aurita, *Brocchi ?*	.	x	.	x	.		
Pectunculus cainozoicus, *Ten.-Wds.*	x	.	x	x	.		
laticostatus, *Quoy* ...	x	x	x	x	x		
convexus, *Tate* ...	.	.	x	.	.		
Barbatia consutilis, *Tate*	.	x	.	x	.		
crustata, *Tate*	.	x	x	x	.		
celleporacea, *Tate* ...	.	x	.	x	x		
pumila, *Tate*	.	x	.	x	.		
simulans, *Tate*, var. ...	x	.	.	x	.		
interclathrata, *Tate* ...	*	.	.	.	.		
Plagiarca cainozoica, *Tate*	x	x	x	x	x		
Cucullæa Corioensis, *McCoy* ...	x	x	x	x	x		
Crassatella communis, *Tate*... ...	x	x	x	x	x		
Dennanti, *Tate*	.	x	.	x	.		
abbreviata, *Tate* ...	x	.	.	.	.	R. Murray	
Hallii, *Tate*	*	.	.	.	.		
Trigonia semiundulata, *McCoy* ...	x	.	.	x	.		
tubulifera, *Tate*	x	x	.	x	x		
Mytilicardia alata, *Tate*	x	.	.	.	.	Aldinga	
Cardita delicatula, *Tate*	x	x	x	x	x		
polynema, *Tate*	x	x	.	.	x		
compacta, *Tate*	.	x	.	x	.		
scabrosa, *Tate*	.	x	.	x	.		

Carditella radiata, *Tate*	x	.	.	.	.	Aldinga
inornata, *Tate*	*	.	.	.	.	
Lucina araneosa, *Tate*	.	.	x	x	.	
leucomomorpha, *Tate* ...	x	.	.	x	.	
projecta, *Tate*	x	.	.	x	.	
Diplodonta subquadrata, *Tate* ...	x	.	.	x	x	
Verticordia echinata, *Tate*	*	.	.	.	.	
Chama lamellifera, *Ten.-Wds.* ...	x	x	.	x	x	
Cardium psendomagnum, *McCoy* ..	*	.	.	.	.	
antisemigranulatum, *McCoy*	x	.	.	x	.	
ornithopetronicum, *Tate*	*	.	.	.	.	
Chione cainozoica, *Ten.-Wds.* ...	x	.	.	x	x	
multitæniata, *Tate*	x	.	.	.	.	Aldinga
propinqua, *Ten.-Wds.* ...	x	.	.	x	.	
Pritchardi, *Tate*	*	.	.	.	.	
dimorphophylla, *Tate* ...	.	.	x	x	.	
Cytherea eburnea, *Tate*	.	x	x	x	x	
tenuis, *Tate*	x	.	.	.	.	Aldinga
Dosinia Johnstoni, *Tate*	x	.	.	.	.	Table Cape
Tellina Masoni, *Tate*	x	.	.	x	.	
equilatera, *Tate*	.	.	x	x	Mioc., Gippsland	
Stirlingi, *Tate*	x	.	.	x	.	
Psammobia æqualis, *Tate*	x	.	.	x	x	
Semele Krauseana, *Tate*	.	x	.	x	x	
vesiculosa, *Tate*	.	x	.	x	.	
præcisa, *Tate*	*	.	.	.	.	
Mactra axiniformis, *Tate*	x	.	.	Mioc., Muddy Creek		
Howchiniana, *Tate*... ...	x	.	.	x	x	
Myadora tenuilirata, *Tate*	x	x	x	x	x	
Phragmorisma anatinæformis, *Tate*	x	.	.	.	.	Table Cape
Myochama rugata, *Tate*	x	x	.	.	.	
Corbula pyxidata, *Tate*	x	x	.	.	.	Aldinga
ephamilla, *Tate*	.	x	x	x	x	
Panopæa orbita, *Hutton*	x	.	.	x	.	
Solecurtus Dennanti, *Tate*	x	.	.	x	.	
Aspergillum teredina, *Tate*... ...	x	.	.	.	.	Table Cape
PALLIOBRANCHIATA.						
Terebratula vitreoides, *Ten.-Wds.*	x	x	.	x	x	
Waldheimia insolita, *Tate*	x	x	x	x	.	
Corioensis, *McCoy* ...	x	.	.	x	x	
Garibaldiana, *Davidson*	.	x	.	x	x	
Terebratulina Scoulari, *Tate* ...	.	x	x	x	.	
Davidsoni, *Etheridge*	x	.	.	Aldinga, Table Cape		
Magasella compta, *G. B. Sow.* ...	x	x	x	x	.	
POLYZOA.						
Salenaria rutella, *Ten.-Wds.* ...	.	.	x	x	x	
concinna, *Ten.-Wds.* ...	x	x	.	x	.	
Lunulites petaloides, *D'Orb.* ...	x	.	x	x	.	
Cellepora fossa, *Haswell*	x	x	.	x	.	Rec.
Lepralia edax, *Busk*	x	.	.	Mt. Gambier, Rec.		
ECHINODERMATA.						
Paradoxechinus novus, *Laube* ...	x	.	.	R. Murray, Aldinga		
Psammechinus Woodsi, *Laube* ...	x	.	.	R. Murray, Aldinga		
Scutellina patella, *Tate*	x	.	.	x	.	
Clypeaster Gippslandicus, *McCoy* ...	x	.	.	x	.	R. Mitchell
Monostychia australis, *Laube* ...	x	.	.	.	.	R. Murray
Echinolampas posterocrassus, *Gregory*	x	.	.	.	.	Aldinga
Holaster australiæ, *Duncan* ...	x	.	R. Murray Cliffs, Aldinga			

Pericosmus compressus, *McCoy* ...	x	.	.	.	R. Murray Cliffs
Cyclaster Archeri, *Ten.-Wds.* ...	x	.	.	.	R. Murray Cliffs
Eupatagus Murrayensis, *Laube* ...	x	.	.	.	R. Murray Cliffs
rotundus, *Duncan* ...	.	x	.	.	R. Murray Cliffs
Lovenia Forbesi, *Ten.-Wds.* ...	x	.	.	x	R. Murray Cliffs
Astrogonium sp.	x	.	.	.	. Aldinga
Antedon breviceps, *Tate*	*	.	.	.	.
ZOANTHARIA.					
Flabellum Candeanum, *Ed. & H.* ...	.	x	.	x	x
pedicellare, *Tate*... ...	.	x	x	x	x
Victoriæ, *Duncan* ...	x	x	x	x	x
distinctum, *Ed. & H.* ...	x	x	.	.	. Aldinga
medioplicatum, *Tate* ...	*	.	.	.	.
circulare ? *Ten.-Wds.* ...	x	.	.	.	Eoc., N. Zealand
Placotrochus deltoideus, *Duncan* ...	x	x	x	x	.
elongatus, *Duncan* ...	x	x	x	x	x
Notocyathus australis, *Duncan* ...	x	x	x	x	.
excisus, *Duncan* ...	x	x	x	x	.
alatus, *Ten.-Wds.* ...	x	.	.	.	. R. Murray
viola, *Duncan* ...	x	.	.	x	.
punctatus, *Tate* ...	x	.	.	x	.
Conocyathus cyclocostatus, *Ten.-Wds.*	x	.	.	x	.
Trematotrochus fenestratus, *Ten.-Wds.*	x	.	x	x	.
grandipora, *Tate* ...	x	.	.	x	.
bicyclus, *Tate* ...	x	.	.	x	.
Trochocyathus Victoriæ, *Duncan* ...	.	x	.	.	.
meridionalis, *Duncan*	.	x	.	.	.
bellicostatus, *Tate*	*	.	.	.	.
Deltocyathus Italicus, *Ed. & H.* ...	x	x	.	.	.
Conotrochus typus, *Sequenza* ...	.	x	.	.	x
Smilotrochus vacuus, *Ten.-Wds.* ...	x	.	.	x	.
Amphihelia incrustans, *Duncan* ...	.	x	.	.	.
Conosmilia anomala, *Duncan* ...	.	x	.	.	.
lituola, *Duncan*	.	x	.	.	.
elegans, *Duncan* ...	x	x	.	.	.
striata, *Duncan*	x	x	x	x	.
Bathyactis discus, *Ten.-Wds.* ...	x	x	x	x	.
basiporosus, *Tate* ...	*	.	.	.	.
Cycloseris tenuis, *Duncan*	.	x	.	.	.
Balanophyllia australiense, *D.* ...	.	x	.	.	.
Selwyni, *D.*	x	x	.	.	.
cylindrica, *D.* ...	.	x	.	.	.
Ulrichi, *D.*	.	x	.	.	.
campanulata, *D.* ...	.	x	.	.	.
Graphularia senescens, *Tate* ...	x	.	.	.	. Aldinga

Diagram Section from Pebbly Point to Lake Gnotuk.

Approximate Horizontal Scale, 1 inch to 8 miles.



a. Æolian Limestone. *b. Basalt.* *d. Drift.* *e. Eocene.* *m. Mesozoic.*

Customs, Rites, and Superstitions of the Aboriginal Tribes of the Gulf of Carpentaria, with a Vocabulary.

By W. G. Stretton, Special Magistrate, Borroloola, Northern Territory.

(Communicated by E. C. Stirling, M.D., F.R.S.)

The customs, rites, and superstitions of the tribes of natives inhabiting those portions of the Gulf of Carpentaria traversed by the Roper, Limmen, McArthur, Robinson and Calvert Rivers, as well as the islands comprising the Sir Edward Pellew group, differ in a very great measure from those of the more inland tribes. This is attributable to their long intercourse with the Malay trepang-fishers. That intercourse with some foreign people existed nearly a century ago is proved by the records of Matthew Flinders, Commander of H.M.S. Investigator, who, during his survey of this coast in 1802, speaks of the existence of relics left by such people on the Sir Edward Pellew group of islands. Probably these were Malays, who still visit our Northern coast every year for the purpose of gathering trepang. It is not my intention to go further into the history of these Malays or their trepang fishing, as the subject has been fully treated by Mr. Alfred Searcy, Sub-Collector of Customs at Port Darwin; but I briefly mention this fact, as I shall show further on that some of the peculiarities of these particular tribes are due to long intercourse with a foreign people. I have had great opportunities of studying the customs and idiosyncracies of the native tribes of Northern Australia, having been a resident in its tropical region for twenty-three years and, since my residence in this particular locality, I have been much impressed with the importance of writing a record of them; although incompetent to do so myself, I shall have very much pleasure in assisting in the research. I have appended hereto a long list of the various tribes on, and about, the before-mentioned rivers. The dialect used in all cases is that of the tribe located at Borroloola, this being the native name of this township, which is situated on the west bank of the McArthur River, and southwards from the coast about fifty miles. The name of this tribe is Leeanuwa.

The Malay cast of feature is very pronounced, and there are at the present time several half-castes. The face is much sharper than that of the usual native type; the flat nose, so characteristic

of the Australian aboriginal, is very rarely seen, and his characteristic cunning and braggadocio has with these become more strongly developed than in the more inland tribes. Vanderlin Island, the largest of the Pellew Group, is the *rendezvous* of a most determined and bloodthirsty people, who have already become notorious for the murder of several white persons on this river. I am quite willing to admit that some of the murders committed by aboriginals have been brought about by the victims, but many of the tribes with which I am now dealing will take bread from you with one hand, while they murder you with the other. They will resort to all sorts of schemes and devices to lure you from your camp, even to the offer of their women; they will then rob your camp, and you will be extremely lucky if you escape with your life. I would like to relate an instance that occurred to a party coming overland from Burketown, consisting of three white men and a young Queensland black boy. At about 5 p.m. they camped on the Calvert River. Soon afterwards, while they were having their tea, two blackfellows came up, and gave them to understand by signs that there were two horses on a small creek close by. Two of the party went to look at these horses, leaving the other white man and the black boy in the camp. As soon as the two men were sufficiently far away to be out of hearing, about twenty natives, all having a number of spears, rushed into the camp and attacked the white man and black boy. However, the man was able to get hold of his repeating rifle, and after a few shots drove them off. At the same time some shots were heard down the creek, and the two men, hurriedly returning, explained that they also had been attacked, while they could see no sign of any strange horses. The party then immediately saddled up, and travelled on all night. This is only one of many instances in which the natives have tried, and in some instances with success, to lure the unwary traveller to his doom. I do not suggest that the aboriginal is always to blame, but the cases in which the white man brings the punishment upon himself are few and far between; and I wish merely to show how cunning they are in some of their subterfuges.

The Vanderlin tribe are expert canoeists, and are possessed of some very fine canoes, made out of solid trees, which have been left there by the Malays. They are particularly fond of tobacco and arrack (a kind of white rum), are extremely superstitious, and many of their corroborees are reiterations of deeds of prowess performed by their ancestors, in which, of course, nothing of the heroic is lost. One corroboree (a favourite) is descriptive of a large snake that appears every year, generally about the first heavy rains, and takes away an old man from

the tribe. This snake only appears to the old people and, as soon as it is seen, an old man dies and mysteriously disappears. Of course, out of the many tribes it is more than probable that an old man will die every year. As soon as the fact is known by the other tribes their cry is "Yes, snake take him."

I have frequently tried to obtain from the young and more intelligent natives a reason for this illusion, but they persistently believe it to be true and nothing will shake that belief. It is not generally understood that the chanting of past records, such as of any wonderful or startling event, is customary with the Australian native, and I am quite of opinion that it is only among some of these Gulf tribes that such is the case. Perhaps the reason is not so difficult to understand, when it is known that some of the native races of the Celebes Islands, who have no written history, chant their past deeds, and so hand them down to posterity. May not this custom have been instilled into the minds of these tribes by the visits of the Malays to our northern seaboard? Another corroboree, relative to the approach of the white man, is sometimes performed.

No much lower race of human beings exists than the Australian aboriginal. Although he is capable of improvement, he is more than apt to go back into his wild state, to whatever extent he may have become subject to the influences of civilisation. We have instances in this locality in which boys have been taken up by Europeans, taught to read and write and treated in every way as the equal of a white man, yet they have eventually returned to their tribes. In the case of the late murder of Clark and Dolitte at Bowgan, the ringleader of that dastardly and inhuman outrage was a young blackfellow named "Box," who had lived with Europeans for over nine years.

I will now to the best of my ability state such information as I have to offer concerning the Gulf tribes, in a form suggested by a detailed set of "Questions on the manners, customs, religion, superstitions, &c., of uncivilized or semi-civilised peoples," by J. G. Frazer, M.A., Trinity College, Cambridge, which was supplied to me by Dr. Stirling. The numbers in the text are those of Mr. Frazer's questions, and they have been retained for convenience of reference and comparison.

Tribes.

1. The natives are divided into tribes consisting of a chief and from 60 to 100 souls; they are not subdivided again into clans or castes. For the names of tribes and individuals see appendix.

2-3. The only difference in dress is the mode of wearing the hair, that is when any attention is paid to it at all, which is seldom.

Nearly all the tribes I am now dealing with plait the hair into a conical form, with string made from the fur of the opossum. The tribes further inland leave the hair very bushy, and ornament the forehead with kangaroo teeth, which are attached to the hair. The covering of the private parts is nearly the same throughout Australia; with these tribes that of the male is called "Woocarrala," and that of the female, "Mada Madda"; these are also made from opossum-fur. On very special occasions they wear necklets made of short lengths of grass-stems threaded like beads.

4. They do not take their names from animals or plants, and they cannot tell how, or from what, their names are derived; but, as with us, many water-holes, and particularly camping places, are named after chiefs or other notable men of their tribes; for instance, Bindawadgie is the name of a member of the Leeanuwa tribe and a large camping place is named after him. When a child is born it takes the name of some dead relative or friend of the same tribe, and sometimes a name is manufactured from portions of other names. They will not eat the flesh of the crocodile, not on account of it being held sacred, but because they believe that if they eat it they will waste away and die. The flesh of the crocodile is certainly not very tempting and the odour is extremely offensive.

5. They will not, for the same reason, even touch its bones.

6. They assert that their tribes originate from a monstrous native whom they call "Gnabya," and in their lamentations the refrain of "Gnabya! Gnabya!! Gnabya!!!" is frequently heard; but beyond this it is but very seldom any reference is made to him. It is generally the very old women who are loudest in this refrain, and they will keep it up with a dirge-like monotony for twelve or fourteen hours until thoroughly exhausted.

Birth, Descent, Adoption.

7. At the birth of a child the mother is always assisted by her mother or some near relative. At the approach of delivery she retires into seclusion and remains there until a few hours after the birth; the after-birth is buried immediately, as they have a very strong superstition that if it be eaten by a wild dog the child also will be eaten by dogs. The umbilical cord is tied with fibre, generally very close to the navel; it is then severed with a sharp piece of flint, and the infant is wrapped in "paperbark" (*Melaleuca Leucodendron*). No ceremony of any kind at birth is observed.

8. During pregnancy no difference in diet is observed until after quickening; very little meat is then taken until about ten days after the birth of the child. The mother subsists during

that period entirely on roots, berries, fruits, &c. There is a kind of wild parsnip, of which the natives are very fond; this, if in season, is eagerly sought for during the first few days after childbirth. A few hours after the child is born the mother walks about apparently as strong as ever. The number of days she remains away from her husband depends a good deal on the number of his wives.

9. The husband makes no difference in his mode of living either before or after the birth.

10. The father always names the child, but without the slightest ceremony. Usually it is called after some dead relative, and it is very seldom that a name has to be manufactured. No two children bear the same name.

11. In the case of the death of an elder brother or sister they will give the name of the deceased to a child just born, the naming taking place as soon as it is born, but without ceremony.

12. It is a common occurrence to kill the firstborn, irrespective of sex. The fact that the child has been killed is not always known to the father, and he takes no trouble to enquire into the matter; in the mother extreme youthfulness is one of the reasons for killing the firstborn. If the birth has been a painful one, the mother will herself sometimes kill it; and if she be too weak, it is often killed by the attendants.

13. The child always takes the name of the father's tribe, and belongs to that tribe; but if the child be a female, and having been stolen by another tribe marries one of its young men, she of course becomes a member of it.

14. Adoption is largely practised, and in the case of the adoption of a female child, she is at the disposal of the foster mother, who generally gives her to some young man of the tribe in exchange for some ornament, trinket, or food. No ceremony accompanies the adoption. If it is a boy, he manages to get food as he best can, though while he is a baby he is cared for as much as the girl. The boys, however, get very little meat until they are able to obtain it for themselves.

Puberty.

15. The only ceremony of any very great importance is performed at puberty, and is always carried out with great pomp and ceremony. I will endeavour to describe the ceremony as observed by myself. A camp or open space, which I will call "the circle," is cleared to a diameter of thirty yards and swept quite clean. Half of "the circle" is fenced round with bushes, on the inner side of which are seated the councillors or leaders of the ceremony, the chief being in the centre of them. None of the women or children are allowed near "the circle," but are camped some two

or three hundred yards away. At about 7 p.m., or as soon as the moon is well-up (these ceremonies are always performed during full moon), a weird cry is heard in the distance. All in the vicinity of the circle are still as death; the plaintive cry, which much resembles the shriek of the stone-plover, continues and as it approaches nearer the chief in a low voice now and then commands silence. After about ten or fifteen minutes, between thirty or forty warriors, painted and most gorgeously arrayed in head-dresses of emu-plumes and other fanciful coverings, advance from the direction of the cry, and from the midst of these advancing warriors one of the fleetest darts forward towards the circle, and at every thirty or forty yards falls prone to the earth, with his ear close to the ground. This is repeated until near the circle, when he glances hurriedly at the seated figures and rapidly returns to his fellow-warriors, with the assurance that all is right and everything is ready for the ceremony. The warriors then advance in a compact body to the centre of "the circle," seating themselves face inwards and with heads bowed to the ground. One of the guardians from beneath the brush-shelter then approaches these warriors, and with a piece of yellow ochre makes a cross on the backs of about half of their number, thus indicating the individuals who are to seize the boys that are to undergo the rite. In the meantime the elderly men who have charge of the boys are seated on the convex side of the brush-fence. A corroboree is now commenced, in which the women in their camp take part. This corroboree, or chant, has no reference to the ceremony; but its purpose is rather to divert the attention of the boys from the ordeal that awaits them. I was informed that the boys did not know what was to be done to them; but from their abject looks I am inclined to think that they must have had some idea. On the whole, however, they behaved very well indeed. No young boys or girls are admitted within sight of "the circle," but are compelled to remain in the camp with the old women, while the corroboree still goes on, with a dirge-like monotony, until very near daylight. Suddenly all are startled by the chief, who, in a loud voice, demands the boys from the elderly natives, and commands the yellow-cross warriors to seize them and bring them into "the circle," one of the elderly men accompanying each boy. On entering "the circle" a yellow-cross warrior drops on his hands and knees, another throws a boy across the kneeling warrior's back, and one of the old men advancing with a piece of sharp flint called "Boorawa," takes the end of the foreskin between the thumb and finger and cuts the end off, which he places on a piece of paperbark. He then takes the penis between the thumb and forefinger, turns it up, and slits the urethra close to the back

part of the foreskin. Some of these slits, being clumsily done, extend nearly the whole length of the penis ; while others form only a small hole, which sometimes has to be enlarged. Through this slit they always pass their water. The pieces of foreskin are taken away by the old men and thrown into a waterhole containing lilies. This is done to prevent the young men from becoming ill after the ceremony, which, indeed, so seldom occurs that the fact of throwing these clippings into a waterhole is considered a preventive beyond dispute. Each boy is then presented with an outfit—first with a covering for his person, and then with the various implements used in war or in the chase. No dressing whatever is used after the operation, and the wounds appear to heal very rapidly. The object of performing the ceremony at daylight, or shortly before, is to prevent any of the young people knowing anything of it, and this is the only occasion in which any kind of decency is shown to the younger members of this strange people. The night after the ceremony, and for several nights following, a grand corroboree is performed, and it is during these latter orgies that the young men are allotted their wives—that is, so far as those are available for them ; but, as subsequently stated, they generally obtain their wives from other tribes by stealth or capture.

While on this subject, I will describe a corresponding operation which is performed on the young gins (23), and with the same instrument. Formerly, that is, previous to the advent of the white man, it was accompanied by a similar ceremony to that above described, with the exception that the women took the part of the yellow-cross warriors and of the elderly men in charge of the boys. Young men, girls, and boys were not allowed near "the circle" when the rite was performed. Now, however, it is done without any ceremony. It is a most brutal and inhuman ordeal, and the natives seem to have an idea that if conducted with any pomp or display civilisation would not tolerate it. It is now conducted as follows :—An old man, generally a relative other than the father, takes the poor girl, without the slightest warning, into seclusion, and with the piece of flint previously described enlarges the opening of the vagina ; this operation, brutal in the extreme, must be, indeed, very painful, as the cries are described by my interpreter as sometimes dreadful to hear. No white men, of course, would be permitted to witness these ceremonies, even were they inclined to do so. The object of this operation is to enable the male to have easier access ; and this may have relation to the fact that, in consequence of the operation performed on the boy—I refer to slitting the urethra—the penis when erected has a downward curve. A number of young girls are now escaping this brutal ordeal, as

also are a fair percentage of young men, so that it will probably, in a few years, become a thing of the past. With regard to the operation performed on the young men, I have been very particular in obtaining all possible information as to the reason of the male rite, and am convinced that it is done purely for the sake of cleanliness and not, as I have frequently heard, to prevent procreation. To convince me that I was wrong, a friend of mine in this district said, "Now we will go into the natives' camp, when I will satisfy you." On arrival there, he selected an intelligent young native, and said to him, "By-and-bye you cut him Dyimboo (penis), you no more make him Leeardooberrie" (children). The reply was, "Yah (yes); no more make him." I objected to the manner of putting the question, and, in my turn, said to the native, "Suppose you cut him Dyimboo; you no more get him sore fellow?" The reply was, "Yah; no more get him sore fellow." So that one has to be careful, and not rely too much on leading questions. My interpreter knows thoroughly well now what my object is in putting all these questions; but even with him I never lead directly up to a subject.

16. The pretence of killing, and then of restoring life, is not practised with these tribes; although if a young person dies, they all get round the body and try to keep it warm.

17. After the initiatory rites, the boys are allotted wives, but they do not have sexual intercourse with them until one moon, or month, after the ceremony.

18. Some of the tribes knock out the front teeth in the upper jaw, and all of them pierce the cartilage of the nose; these mutilations are performed without any ceremony. During corroborees a stick is inserted through the nose, simply as an ornament.

19. After the young man has quite recovered from the operation performed at puberty, he is marked and scored with a piece of flint across the chest; this is generally done by the young wife, and he in turn marks her in the same way. Sometimes the wounds are made on their own persons, and it is wonderful the amount of misery and pain they will bear in order to be in the fashion; perhaps they are not peculiar in this respect; however, they consider it more manly to have these marks, and it would be impossible to find an aboriginal without them. Young couples will pass the greater part of their time in adorning each other. He makes necklets for her, and she makes armlets for him.

20. Any person is competent to put on these marks. You may sometimes see a broad-arrow on a blackfellow, put on by a white man, with, of course, the consent of the native. I have seen the resulting cicatrices standing out quite an inch from the ordinary surface of the flesh.

21-23. Both sexes are marked alike, and, so far as I know, the markings have no significance beyond show.

24-26. A girl is secluded at her first menstruation, during which she sits on a piece of "paper-bark" in her mother's camp, but they are not secluded at subsequent periods. During their courses they observe no particular rules, except that, if they are sick or very weak, they are then rubbed with Eucalyptus leaves made hot over the flame of a fire. In assigning a cause for the flow they simply say that Gnabya *(vide* 6*)* makes the blood come every moon, and that in a few days he will stop it again. Although a most brutal and inhuman race of people, they possess a very wholesome dread of having sexual intercourse during menstruation, and positively assert that any man so doing will become covered with sores; but, as stated, she is not secluded after the first period; at subsequent periods she may be seen and conversed with, and she is merely looked upon with compassion.

Marriage.

27. A man is not allowed to marry any of his own tribe unless it is very clear that no blood relationship exists, however remote.

28-29. Young men and women have sexual intercourse without marriage, and if the young woman becomes pregnant the young man is compelled to take her as his wife. If a man cohabit with a woman already married, and her unfaithfulness is discovered or even suspected by the husband, she is beaten most unmercifully, and sometimes deliberately killed, without interference with his brutality to his wife. Sometimes he gives her away to a polygamist, which is considered a great punishment. A male adulterer, if unmarried, is banished from the tribe until he can capture or obtain a wife from some neighbouring tribe.

30. They are very strict with regard to the degrees of consanguinity, and will not permit the marriage of blood relations, however remote; but they allow a man to marry his deceased wife's sister, or a woman her deceased husband's brother. A young man, son of a captured woman, who captures a young woman from his mother's tribe must be very careful to find out that she is not a relative, or he will not be allowed to have her.

31-32. Polygamy is extensively practised, but polyandry is unknown.

33. The reason they assign for having more than one wife, is that they will be better supplied with honey and other edibles, the procuring of which is among the duties expected of the women. Where there are a number of wives living together in this way, there are never ending fights and squabbles, so that a surfeit of connubial bliss has its dark side. The husband never

takes more than one of his wives when on a hunting trip, but takes them in turn. Those who remain in the camp, procure honey and roots in the near neighbourhood, ready for the husband on his return. They also collect a quantity of lily seeds which they pound up on a flat stone, and with the flour make a kind of "Johnny cake."

34. A man obtains his wife generally by capture, but sometimes the wife-seeker is allowed to come into camp to select a wife. It is considered far more manly and heroic to steal the wife, and she prefers this mode of being wooed. On the death of a man whose wife has been captured from a distant tribe, the widow is given to another man of her late husband's tribe; but if possible, she contrives to be stolen by a member of some tribe not originally her own.

35-36. On capturing a wife, the husband takes her to his country and home.

37-39. No ceremony whatever is observed at marriage, and the bride is not veiled, nor is she ever represented by a dummy or proxy.

40-41. There are no bridesmaids or best men, nor is there any ceremony on the day after marriage.

42-43. As there is no marriage ceremony, the man cohabits from the date of capture without allowing the lapse of any fixed period; and the custom does not exist of visiting the wife by stealth. In the case of a newly-married man, he is always with her.

44. It is neither required nor permitted that the wife should be deflowered or have sexual intercourse with another man before her husband.

45. Men abstain from cohabiting with women during menstruation, for the last few days of pregnancy, and for about ten days after childbirth.

46. Wives are sometimes exchanged and sometimes given away, and a widow is free to marry whom she chooses. Sometimes a woman objects to be mated with a certain man, but as a rule, in their opinion, one man is as good as another.

47. A woman may look at and speak to her father-in-law, but a man may not look at or speak to his mother-in-law, or his wife's relatives. This is a custom that I have never seen so persistently carried out as it is with these tribes. A man passing a camp in which are seated *any* of his wife's or wives' relatives, will shroud his eyes, and, in fact, go considerably out of his way to avoid seeing them. I have noticed this particularly in the case of my interpreter. His wife's father and mother are always in this township, and on several occasions I have employed the old man to cut wood and carry water, &c. On one occasion I was

engaged at something in which I received the combined assistance of my interpreter and his father-in-law ; but during the whole of the time the young man kept his head turned away from the old man, and would not for any consideration speak to him.

48. Brothers and sisters may both see and converse with each other.

Disease and Death.

49. When any of them become sick they suppose "Gnabya" is angry (6), and they attribute the cause of death also to him. I must admit that I have had some difficulty in getting information relative to this subject. Without being able to explain it they seem to have some idea of the mystery of death, but very few of them will converse on the subject.

50. Nearly all complaints are treated in the same manner, that is by continually rubbing the affected parts with the inner bark and leaves of a Eucalyptus tree, heated over a fire. About two years ago influenza broke out among the natives here, and I have witnessed, with very great interest, this practice of rubbing the body with Eucalyptus leaves. The patient lies, face downwards, close to a slow fire. The doctor, or operator, also sits close to the fire, with a large heap of leaves close at hand. He keeps up a continual rubbing of the body with these leaves heated over the fire, and from this treatment they appear to obtain great relief. In cases of venereal disease, the person suffering will go into very muddy water and remain there for hours, and apply clay to any open sore. During the cold season they are covered with ringworm, which they cure with applications of a solution made of the dark gum that exudes from the gum-trees ; but they are not particular about getting rid of the eruption, and pay very little attention to its cure. For rheumatic pains the bleached bones of a kangaroo, pounded to a fine powder and rubbed on to the affected parts, are considered to be a certain cure.

51. They think that "Gnabya" makes them unwell, but beyond the lamentation of "Gnabya ! Gnabya ! Gnabya !" there does not appear to be any further appeal to him for relief or assistance in any of their troubles.

53. On the death of a native, his relatives assemble round his body and, as soon as they are assured of his death, they beat themselves about the head with sticks and sharp stones until the blood streams down their faces, old men and women crying aloud like children. After a time, when the mourners have modified their grief, four male relatives or friends will enfold the body in many wraps of "paper-bark," and they then prepare a staging or platform among the branches of a fairly-well shaded tree, on which they place the body, where it remains until all the

flesh is off the bones. The bare bones are then collected and placed in a hollow log about five feet long and ten inches in diameter. The ends of this are closed with pieces of "paper-bark," and the coffin is placed between the branches of a tree, well secluded and away from their own haunts. Rocky ravines and almost inaccessible places are invariably chosen as the last resting place of the bones. At this final burial rite a great corroboree takes place, varying in pomp according to the importance of the departed. If he has been a great warrior, all his brave deeds are then recounted, and he is immortalised by a special corroboree made for him; and thus his history and deeds are handed down. Very little notice is taken of the death of a woman.

54. Ghosts of the departed are generally believed in, but while there is any flesh on the bones of the body recently placed on the first tree, there is not the slightest fear of the ghost appearing; but immediately the coffin is placed in the secluded spot, or, in other words, as soon as the flesh is all off the bones, the ghost is liable to appear, and it is only at this time that it is seen. When the ghost appears, the four men previously mentioned, if living, remove the bones into the camp. If the ghost follows, it is commanded by the old men in a corroboree to leave, which it does, and is not again seen. If one of the four men happens to die between the death of his friend and the seeing of the ghost, his body, if not too offensive, is brought into camp and is considered a certain remedy against the appearance of the ghost of any person dying at that time. If they dream of a ghost or any uncanny object, they believe they have absolutely seen the ghost and act in every way as if they had. After the disposal of the ghost, the bones are taken to another place.

55. The persons engaged in the burial rites start a monotonous dirge and continue it until the ceremony is over; and, even for weeks after the death, they are apt to break out in the melancholy refrain. If a near relative happens to be away, when the death occurs, and comes into camp a month after, he will begin howling like a wild dog. I have frequently been compelled to send them word to desist.

56-57. Neither the widow nor relatives have any special observances after the death of a warrior, and they wear nothing *in memoriam* beyond what has been related. There are no other special customs or superstitions concerning the bones of the dead.

Murder.

58. A murder is avenged by the relatives of the victim; in fact, all members of the tribe are commanded to avenge the death. All members of the murderer's tribe are responsible, and any of them falling into the hands of the relatives of the victim are put to death without any recognised form.

59. They will accept no compensation, but will be avenged. Of course mistakes are made, and sometimes the murder goes unavenged; but they are like blood hounds when once on the track.

60. A murderer is not considered unclean; but, with his own tribe, he is rather made much of. A murder, as they understand the term, is not of frequent occurrence.

Property and Inheritance.

61-64. After the death of a chief, his eldest son assumes the position and, if he should not have arrived at puberty, an old warrior is selected to act until the son has gone through the ordeal. Even then he has very little power, and very little attention is paid to him until he has proved himself worthy of the position. They have no property, except the piece of country on which they were born. The installation of a new chief is always a ceremony of importance. A circle is formed, as in the case of the ceremony at puberty, and the chief-elect is led into the circle, with his head completely covered. All those in attendance (no women or children are allowed) begin a corroboree, first chanting the many good qualities of their old chief, and gradually coming round to the many things expected of the new, who is then and there acknowledged to be their head man. He is presented with a "Narleega" (throwing stick), which is carved and painted very gaudily. The newly-made chief is then uncovered. He assumes command, and orders a corroboree and dance, which is continued all night. He wears no distinctive dress, and a stranger would not know who was the chief.

Fire.

65. Fire is obtained by friction of one piece of wood against another. The horizontal piece is held under the foot, while the perpendicular piece is twirled quickly round between the palms of the hands with a downward pressure. As soon as smoke is observed, the operator takes from his hair (kept there for the purpose) a piece of wax mixed with fat, about the size of a pea, drops it into the hole made in the horizontal stick, and again twirls the other stick round, with the result that a fine smouldering powder is produced, which, being shaken into dry grass or bark and vigorously blown, soon kindles into a flame. I have seen them produce fire in two minutes.

66. Fires are never extinguished, unless it is to throw pursuers off the track; on the other hand, they will, if very closely pursued and the country is dry, light fires all round to burn the grass, and get away unseen in the smoke.

67. They have no superstition about fire, or story of its origin.

Food.

68. They eat almost everything in the shape of animal food. Crocodiles (*Crocodilus porosus*) are the only reptiles that they will not eat, and they would rather resort to eating each other than touch their flesh. The much smaller Gavial (*Philas Johnstoni*), found on fresh-water lagoons and at the heads of the rivers, is quite harmless, and of its flesh the aboriginal male adults are very fond. They believe that if any of them eat the flesh of the large crocodile, they will pine away and die ; and I know of no tribe amongst which its flesh is eaten.

69. Men and women eat together seated round the fire.

70-71. Children eat with their parents, except when they get shell-fish. These they cook and eat by themselves ; but in the case of game or fish being brought in, the women do the cooking, and the children get their share.

72-75. Cannibalism is practised among some of the tribes. They sometimes eat a child that has died, but they never kill a child to eat the flesh ; and it is only in the case of the death of a young boy or girl that they practise cannibalism. Adults they do not eat, and the mother of a child never partakes of its flesh—in fact, neither women nor children practise it at all, and male adults only when they are extremely hungry, and cannot get animal food ; even then it is done in a stealthy manner, and with as little show as possible.

76. The bones of a child that has been eaten are given to the mother, who carries them about with her for some considerable time, in order to prevent the anger of "Gnabya," or the ghost of the departed child, who visits the camp. After the mother thinks she can deposit the bones in safety, she will do so by putting them into a hollow log, and placing the same in some secluded tree or cave.

77. Immediately on killing a kangaroo they sometimes drink the blood.

78. In the case of the flooding of a woman, they will not even look at her ; but this very seldom occurs, and is the only instance in which blood is abhorrent. Women have no objection, or are they forbidden, to see the blood of men.

79. Fasting is only practised when want compels. If they suffer from indigestion, they start a corroboree and dance.

80. The omental fat of the kangaroo is eaten by the slayer, and a portion of it rubbed on his body ; this is supposed to strengthen the sinews. Women are forbidden to eat flying foxes (*Pteropus*), for if they do so all the flying foxes will leave the locality. They have no idea that they will acquire the qualities of certain animals by eating their flesh.

Hunting and Fishing.

81. Their principal way of catching fish is by staking the mouth of small salt-water creeks during high tide, and filling the spaces between the stakes with grass; in this way a great number of fish are caught. On large creeks the bars, or junctions of fresh and salt waters, are favourite fishing places. The Vanderlin Island tribe are most expert canoeists, and with the dugong-spear they can capture any number of these animals.

82. No special custom is observed in hunting and fishing, except absolute silence, all communications being made by signs. A big corroboree generally succeeds a successful hunting tour.

83-84. The women and children left at home during the absence of the hunters gather honey, fruits, &c.; and there are always a few men left in the camp, in case of a surprise by any neighbouring tribe. On returning from the chase they generally have a big dance, and the hunter who has been most successful is decorated with kangaroo teeth, which are hung round his forehead from the hair.

85. No ceremony is observed with regard to the animals slain. They burn the bones—that is, if their dogs leave any about the camp. They always have a lot of dingoes with them, and it is quite common to see a native woman suckling a young pup; they are, in fact, quite as fond of their dogs as they are of their children, and if one of the former is killed or dies, they make a dreadful row. They also put the dead dogs into the branches of a tree on a stage, but after that pay no attention.

Agriculture.

86-96. They do not till the ground, and agriculture is not attempted in any shape or form. They will even without thought or care destroy their best fruit-trees.

War.

97. No ceremony is observed before going to war. It is rather amusing than otherwise to watch a conflict between two tribes. I have seen some terribly hard knocks given, but as a rule there is far more talk than anything else. When there is any serious difference between two tribes, they meet on an open space. A warrior steps forward armed with waddy, throwing stick and two or three spears, struts about and works himself into a most furious rage; another warrior on the opposite side at the same time goes through the same antics; and presently one of them, having arrived at the proper pitch of passion, throws a spear, or the two warriors will drop their spears, and come to close quarters with their waddies. When one of them is knocked down or gets his waddy broken, the row is all over; but if spears are

resorted to, the fight will last longer, and perhaps several may be wounded; but as a rule, as soon as one is hurt, the fight is over, and they then become friendly and chat together.

98-101. There is no special rule as to diet for fighting-men on the war-path, and those who remain in the camp gather honey, fruits, roots, berries, &c., for the warriors on their return. This is an occasion for holding a corroboree, which varies in importance, according to the amount of success gained. Slain foes are not mutilated.

102. On killing an enemy the victor does not observe any special rites, but he is looked upon as a great warrior and feared by his friends. Those killed in battle are buried with rather more pomp than at an ordinary death, their names and deeds being specially mentioned at their usual corroboree after the bones are deposited in their last resting-place. Even when they are not victorious a corroboree is held. The ghost of a warrior killed in battle never appears; this is because "Gnabya" is satisfied with his deeds. Any individual who has distinguished himself in the engagement is made the hero at the corroboree, and his name is mentioned in all corroborees of a warlike character; he is also presented with a set of war implements.

Government.

103. They have no definite form of government. The chiefs have very little power beyond directing wars or conducting ceremonies.

104. The chieftainship is hereditary only as far as sons and brother's sons are concerned; failing such heirs, a new chief is elected from the elder members of the tribe who have distinguished themselves. The chieftain has no badge or anything special about him whereby he may be distinguished.

Oaths and Ordeals.

105. No ceremonies are performed in meeting friends or in forming new friendships. The question of making friends is quite foreign to them, that is as we understand the term. They fraternise with individuals or near neighbours, but a fight may occur on the slightest provocation. In the case of a stranger trespassing on the country of distant tribes he is warned-off at once, and he will be fortunate if he be not treated as a spy and killed. Since the approach of the white man all this is disappearing, and the natives of any part of Australia can travel among most of the tribes without much fear of being molested. Nevertheless, there are a few tribes at the present day that will kill any stranger, white or black, that trespasses on their country.

106. They have no special forms of oath, and will make all

sorts of promises, which they break without the slightest compunction; for instance, an old native will say to a young one, "After two moons I will give you that girl;" but long before that time he will have given her to someone else, and in this way fights are often brought on.

Salutations.

107. They use no form of salutation, except when one of their tribe has been absent for some time, say two months. On his return the members of his tribe will all start crying, and behave in a very similar manner to that in the case of a death. As in grief so in joy. The mother of the returned warrior and the other old women will knock their heads with stones until the blood streams down their faces.

Arithmetic.

108. They count up to five, viz., "Yarcoola" (one), "Kinemadda" (two), "Gnarloo" (three), "Leejallija" (four), "Leejakadda" (five); in describing any number after five, they repeat the last number with the addition of the latter part of number one thus:—"Leejakadda-coola," the greater the number the greater the emphasis on the portion of the word *coola*. They speak so very rapidly, and run all their words so much into one another, that on hearing them describe or name a large number you would only catch the sound "Lakicoola."

109-110. They only use the fingers to denote numbers when they are making signs to the deaf and dumb, or in the chase, when the sound of speech would scare the game, and they never use pebbles or sticks in counting.

111-112. They take the number five from the fingers of the hand, and very often instead of saying "Yarcoola" they will hold up one finger; or two fingers for "Kinemadda" and so on; but they have no name for any number beyond five except "Leejakadda-coola," which means many.

Writing.

113. They send messages and profess to be able to understand them. I have, in travelling over the district, often carried "Yabber-sticks" for the natives; but it is generally done in this way:—The person wishing to send a message will prepare a "Woonda," and hand it to the messenger with this message, "You give this 'Woonda' to 'Bindawadgie,' and tell him to send me some boomerangs and string. Half circles and angles indicate boomerangs, and crosses denote hair-string; this string is twisted with a "Narmarlindee," a cross-like arrangement of two thin sticks.

Measurement of Time.

114-117. They refer to the number of sleeps to indicate days, to moons for months, and to seasons for longer periods. In conversation they will say, "I am going away for two sleeps" (two days). "I shall not return for one moon" (one month). "It will be 'Meewidgie' (wet season) before I return." The time of day is reckoned by the sun, and they take notice of the phases of the moon. All their principal corroborees, for instance, are held on the night when the moon rises at the same the sun sets.

118-120. They determine the seasons by the ripening of fruit, and by the changing of the monsoons; but they have neither names for the different months, nor have they a conception of the lunar or solar year.

121-123. They note the change of the monsoons; the south-east sets in about May, and they know then that the wet season is over. The north-west monsoon sets in about October, and they are then on the look out for the wet season. Their ideas on this subject may best be explained by the description as given by my interpreter:—"First time rain come on, we call 'im 'Meewidgie.' By-and-bye rain go away, cold fellow come on; we call 'im 'Ramardoo.' Then dry fellow come up, we burn 'im grass; we call 'im 'Warrema.' Then big fellow hot come on; we call 'im 'Gnardya.'" So that it would appear from this that their new year comes with the rainy season, say in October or November. Nothing whatever in the shape of a time-keeper is kept by them.

Games and Dances.

124. The young people amuse themselves with small grass spears, blunted at the end. Young men have a game they call "Bowitgee" (going about). A ball is made of paper bark, firmly tied round with string, and about the size of a tennis ball; there are no definite rules for the game, which simply consists of throwing the ball from one to the other very rapidly, and it is wonderful what a time they will keep it going. A young fellow will often just touch the ball, and make it glance off to the next man. A terrific yell of derision greets the unfortunate one who lets it drop. They show, however, a great deal more zeal and attention to their mimic war, which they carry on with the grass spears. This grass may be from four to eight feet high or more.

125. A very popular dance with them is to form a square, opposite sides of which advance, keeping time by stamping heavily on the ground; on meeting in the centre, each side raises the right hand high above the head, and exclaims "Yi!" altogether in a high falsetto voice; they then retire to their places, and the other sides advance in a similar way. The

women supply the music by singing a kind of marching tune, and at the same time by striking one piece of hard wood against another. A few old men also keep time by striking one boomerang against another. Their dances are never of the nature of a religious rite, nor do they in them imitate any animal. Some of them are very disgusting.

Magic and Divination.

126. They assert that they are able to produce rain and practise the following method :—An old man, generally the chief or some one deputed by him, strolls quietly away from the camp, singing in a low humming kind of tone "Gnabya, Gnabya; Wyarrie, Wyarrie" ("Gnabya" is the spirit or ghost; "Wyarrie" is water). He then goes into a waterhole, whilst muttering the above words, dives and stays under water a considerable time, still repeating the same words ; he then strolls back to the camp, with head bowed down, and never venturing once to look up. On his arrival in the camp, he declares when the rain is to come, and it very often does come. They will not attempt to predict or make rain until there is almost a certainty of a shower. If a heavy storm comes on, and they have had no hand in it, they declare that some chief of a distant tribe has sent it ; and if they should not require rain at that time, it will probably cause a hostile meeting, unless the chief of the suspected tribe says it was some other chief further on that made the rain. This, however, he seldom does, as he is only too proud of the distinction of being able to annoy his enemies, and will rather fight than deny the impeachment. They also profess to be able to stop the rain, but I know, to my great discomfort, that in this they are not to be relied upon. I was out with a young blackfellow on one occasion, when a heavy storm was seen approaching. I said, "You think it rain come up, Charley?" He said, "My word, I think it big fellow come up. Me kill 'im?" I said, "Yes, you kill 'im." He dismounted, and gathered a wisp of straw, and after making water on it, shook it in the face of the approaching storm. He then mounted and we rode on, and in about ten minutes we were thoroughly drenched! I chaffed him about killing the rain, and he was sulky all day.

127. There are no professional magicians, sorcerers, doctors medicine men, or witches among them. Some of the old men profess to be able to cure diseases *(vide* 50).

128. A few of the old men are selected to attend to any one that is ill, but as a rule Nature is the only attendant. Only a few days since there was a terrible fight between the gins, which was thus brought about :—"Bindawadgie" is the possessor of three or four gins (females). "Ghepangarra" stole one of them

—"Moogrubinna" by name—and brought her into the township, she being a party to the affair, as she did not like "Bindawadgie." On arrival in the township, the runaway gin camped with a few others, when one evening she was pounced upon by "Mootokobinna," a sister of "Bindawadgie," assisted by several other women, and the consequence was that they nearly killed her. I have been attending to her since the fight, but not having much confidence in my skill, she has gone to the camp to be treated by her friends. I went this morning to see her, and found her in the camp groaning, without any one to look after her, until I then got some of the old women to do so.

129-132. If a native chief should be very angy with another tribe, he will "make thunder and lightning" by retiring to a cave, or a very secluded spot, where he sings a low-toned chant thus :—

"Jaugabangie cowa,
Rangagea cowa,
Gnaramma, Gnaramma,
Naragoo."

(Thunder come on, lightning come on, kill blackfellow.) This is repeated for about an hour. They do not draw omens from voices, animals, birds, &c., or use any other modes of divination.

Religious and Political Associations.

133. Nothing whatever of the kind is observed.

Men as Women; Women as Men.

134-135. Exchange of dress between the sexes is never practised at any time.

Sleep.

136. Sleep is forbidden only on the night of the performance of the ceremony at puberty. Those taking part in that ceremony are compelled to keep awake, the penalty for going to sleep is to be laughed at and considered "old-womanish."

Ceremonial Uncleanness.

137. There are no instances of ceremonial uncleanness beyond those already mentioned, but in some of their dances there is a good deal of unclean ceremonial.

Doctrine of Souls.

138-142. They quite believe that the body is possessed of a spirit or ghost, which they call "Gnabya," and when seen is in the nature of a shadow; but there are no particular occasions for the appearance of this shadow. No attempt is ever made to restore life, or call the departed spirit back to the body, and they

have no desire to see the ghost or shadow. Dreams are believed in.

143-144. The members of an adjoining tribe never see the ghost of a member of another tribe, and a man's ghost cannot be extracted or stolen from his body, nor can a person lose it by accident.

145-147. A corroboree may be held and a ghost commanded to leave, on which it is supposed to enter the earth and become a portion of it; it cannot, however, be held or retained.

148. They do not believe in transmigration of souls. I have, it is true, heard it stated that the natives believe that when one of their people die he will, using their own expression, "jump up white fellow." This is entirely erroneous as regards these natives; all that they know about a future state is comprised in seeing the shadow before described. As to whether they *do see anything*, I cannot say; but they are very emphatic on the question.

149-152. Animals, trees, plants and inanimate things are not supposed to have souls, are not dressed as human beings, are not thought to possess a language of their own.

Demons and Spirits.

153-155. Are believed in only so far as has been previously mentioned.

Scape-goats.

156-157. They do not employ scape-goats. Any unfortunates, such as deaf and dumb, silly people, and imbeciles are well looked after.

Guardian Spirits.

158-162. They neither believe in guardian spirits, nor do they think that their lives or fortunes are bound up with some special object, the destruction of which will affect their own lives. Patron objects are unknown.

Resurrection.

163. They do not believe in any form of resurrection.

The Heavenly Bodies.

164-169. None of these are worshipped. The sun, they believe goes into the earth at sunset and appears out of the earth next morning. Stars are imagined to be pieces of fire, and they cannot explain the phases of the moon. An eclipse, they say, is caused by a "big fellow snake"; and if it be a total eclipse, he is supposed to cause some great calamity, such as floods, droughts, pestilences, &c.; but before the actual calamity overtakes them one of the tribe will dream what form it is to take. Thunder

and lightning is made by an angry blackfellow (*vide* 129). A short time ago the natives were camped in a deep gorge about fifteen miles from this township. This gorge is very narrow, and bounded on each side by high ironstone cliffs. During a very heavy thunderstorm a native woman was killed by lightning, when all the natives immediately fled in dismay and hid themselves under rocks until the storm passed over. I have frequently travelled through this gorge and have seen what terrible havoc the lightning makes of large gum-trees, rending, splitting, and hurling large pieces of timber to a distance of three hundred yards. The natives are excessively afraid of lightning, and will accuse the first native of another tribe they meet as being the cause. In their anger they are only too ready to fasten a quarrel on any one.

Sacrifices.

170-173. Sacrifices are never offered.

Miscellaneous Superstitions.

174. They profess to know the moment their wives have conceived offspring, by the shadow of an infant seen by them in the water when bathing. If a half-caste is born, they take just as much care of it as they do of the full-blooded black child, and the mother will tell you who is the father of the child without the slightest hesitation or reserve.

General Remarks.

The natives are very fond of smoking, and it is wonderful to see the quantity of tobacco they will consume. Men, women and children all smoke, and I have seen a child drop the pipe it was smoking, and go to its mother's breast.

Among some of the tribes the first joint of the index finger of the left hand is taken off—but in the case of women only; this is supposed to facilitate the getting of yams, in which operation a very small hole is made, and in this, it is considered, three fingers can be more easily inserted than four.

The young men, if trained early, are splendid horsemen. They are very athletic, and at all sports are far beyond the ordinary European.

Their principal means of communication is by putting up smoke. If they wish to indicate to a friendly tribe that they are going to a certain water-hole, they will make smokes in the direction of the *rendez-vous*. Their way of doing this is as follows:—A fire is made and allowed to burn low, then raked up together so as to form a small heap of live embers. A large quantity of gum leaves are placed round these embers sufficiently close to ignite when heated, and some damp grass is

then thrown on the embers. A dense volume of smoke issues from the grass, and the leaves igniting immediately forces the smoke upwards.

If two tribes happen to meet unexpectedly they form their camps so that each is nearest to his own country. The trespassing party explains why they are there, and if the explanation is satisfactory, a friendly corroboree will probably be held, otherwise a fight may ensue. At some of these accidental meetings women may be exchanged.

They are very expert in many ways, and it is surprising how quickly they can make a spear and have it ready for action; they are also very clever at making rope, which they use for dugong fishing. The rope is made from the bark of the Currajong tree, a species of *Brachychiton*, which these natives call "Myaddo."

In the foregoing paper I have endeavoured to the best of my ability to give a simple and unvarnished description of the manners and customs of these tribes, and trust that something of importance may be gathered from it. I must confess that many of the writings I have seen on the subject have been merely fancy pictures presented for the sole purpose of causing wonder and excitement. As I have previously stated, any information obtained from them must be their own statement, and not the answer to a leading question, however it may be put to them; to all such they are only too apt to reply, "Yes, that is the case."

I shall continue my investigations, and will always be too happy to send to the Museum anything special that I may obtain from the natives, or any information that will be of use.

APPENDIX.

Names of the various Tribes and their Localities.

	No. of Souls.	Habitat.
Leewalloo	130	... Vanderlin Island
Leeanuwa	110	... McArthur River, Borroloola
Leepitbinga	100	... McArthur River, 40 miles up river
Leearrawa	100	... Robinson River
Leealowa	90	... Limmen River
Leelalwarra	90	... Roper River
Leecundundeerie ...	90	... Calvert River
Leenaranunga	90	... Corella Downs
Leewakya	90	... Pine Creek
Leewillungarra ...	90	... Eva Downs
Leechunguloo	85	... Buchanan Downs
Leeangadigie	85	... Hodgson Downs
Leeillawarrie	85	... Bohemia Downs
	1,235	

From Vanderlin Island to Corella is about 260 miles north and south; from Roper River to the Calvert is about 300 miles east and west, and all the above tribes are within that area. There are a few other very small intermediate tribes; but I should not estimate the total number of aborigines within the area specified to exceed 1,600. Coastal tribes are numerically stronger than the inland tribes. On the Barclay tablelands there is a very large area of very badly watered country, consequently the tribes there are few and far between.

NAMES OF INDIVIDUALS OF LEEANUWA TRIBE.

Men.	Women.	Boys.	Girls.
Tarpetanna	Loorabombina	Moongaryala	Nooanghyema
Yarcooncoora	Rabookpooka	Gnarcoolumba	Wypoojubinna
Bindawadgie	Rowleerindowa	Gnarmoolarakoo	Weengetbinna
Yanbalinga	Tuboonmalanna	Gnarlangkoolinna	Rowgnarlemarra
Wyteemareea	Yarcangoora	Martookooroo	Rowillboonga
Ghepongarra	Larleeremanna	Gnarcaroomoo	Leerimboonda
Weetpoowoonyara	Beetingarooma	Gnareetanda	Tarcoomarlee
Toorakoopaddie	Yendamanna	Gnarteebama	Rarjumbalinna
Gnakoorabbie	Mongentoora	Gnarmeengoogie	Rowenbarooma
Gnarbeewaroo	Rarmanpoona	Tangareemadgie	Marloongubinna
Gnardoomanna	Rarmandeere	Karangarmadgie	Leerandeerie
Gnarteramboo	Rangatpoona	Myooroomadgie	Yarmandeerie
Gnarkeradda	Rarbooaboo	Gnarmodagie	
Gnargerdobbie	Beerepolinjanna	Gnarwarkareema	
Rareepoonga	Yeetangauna		
Gnargandarra	Jeekamalanna		
Gnarcoolapoona	Toongamaleema		
Gnaracarra	Moortokabinna		
Gnartagatte	Myyooawa		
Gnargonooka	Moogrubinna		
	Armarawoonga		
	Marlindeerie		
	Rargukoobinna		

This list, with one or two exceptions, and about half a dozen infants, say eight more souls, constitute the whole tribe at the present time.

May 24, 1893.

A

ant (white), rowmarwidgie
ant (black), pingee
ant (green), rowinbeeya
arm, gnarowie
angry, wonginnie
arise, leawarra
after, bargoo; by-and-bye, "bargoo, bargoo"
all, calagga
attempt, wareea (go and try)
ant hill, yareewee
ankle, arnadanga
ashes, arwilla

B

bark, nowelakoo
bee, narboolooloo
boy, ardoo
back, arnawookoo
belly, arnawoodoo
blood, oolya
bone, arnawynyarda
big, wardeerie
bird, chulaggie
black, woonga
blue-tongued lizard, meenyando
brother, wonarga
boat, ramardoo (made of bark)
basket, rowilboonee
boomerang, wargillie, rarmantaperoona
boat-shaped water-vessel, loodoo-loodoo
beetle, quegindie
broken, keeloonoo
bald, ardaboo

brave (bold), nargoongie
better, namerookung

C

cockatoo (white), rarparra
cockatoo (black), rarleeraka
cat (native), rarlanboo
crow, roowoongoo
clouds, gnarwoo
cough, ooloo
chalk (white), owamboona. Used by natives in ornamenting
creek yarla
cockroach, namarooba
cramps, coonaandarrie
come here, cabba cowa
coming, bargee
crying, keewyarrie
crab, yinga
cockles, yarcabacadda
crocodile, mardoombarra
creep, jeewarcangie
cooking, woobya
charcoal, moondoo
camp, mowalangie
children, leeardooberrie
circle, locoloco

D

dew, hownoomaloo
duck, rowgumba
dog (dingo), warkookoo
dead, nangabangakoo
death-adder, wangmacoona
daughter, rangatarrawardoo
dilly-bag, mooloo
dark, moondooro
drink, woondya
dust, moongoo
dumb, ryackayaka
deaf and dumb, yacka bacabba
deaf, bacabba
dugong, keelungakanna
dry, warrema

E

eggs (generally), wadda
emu eggs, warrie
emu, arnanganda
eye, warnammie
ear, naralinna
excrement, mowwoona
every time, keeloowarra
everywhere, yeergūmanda
extra, nayerbarra
eagle, arjarbarumba
earth, owarra
ebony, marpooyarra. Grows plentifully on this river
eclipse (sun), arkalango
echo, wypanda

F

fish, arlkoo
far, wagga
foot, arnamandoo
fingers, arnamaliggie
fire, bweega
feathers, ooloo ooloo
father, woonyadda
fighting, tarlinambya
flat country, mangoona
flying fox (*Pteropus*), marlinginna
feather ornaments, burraka burrakawa, markoodyee
flesh (human), arnawangie
fun, wootoo
flying, loorunga
foam, yoordoo
fire-making sticks, marboodalla

G

grass, woortooa
goose, rowoondangoo
good, rowmoorookoonga
girl, rowarmalangie
gum, marmindie
go away, bowagindeea
green, mardangoo
gale, lambidgie
gall, weegul
gammon (to hoax), darwadde monginnie
gape, darmalidgie
gavial, ootpee
get it, yeenda ardooma

H

hill (large), woodowa wardeerie
honey, doolbarrie
hair (human), arnawada
heart, tannacowandie
hand, arnamalidgie
head, arnawoolya
hawk, toolawaleerie
hailstone, wykoo
hot, gnardya
husband, goangadda
hair-twine, woodyee
him, arloo

I

iguana, chugoobaddie
illness, jumbamarangie

ibis (white), rarboolabool
ice, wykoo Seen by natives on several occasions in the shape of hailstones
idiot, tewarwarngaringie
imitation, barraguaninna
impotent, narmunda

J

jump, jumbarangie
jawbone, arndarra
joy, wootoo

K

knock, keewamba
kitten, booree
know, teenalarnjimmo
kangaroo, woonallee
knee, arnaboora
kingfisher, wardoo
king (chieftain), noweddie
kestrel (small hawk), rowakalla
kick, karraparannie
kill, wyamma
kiss, noweeya
knife, lamma

L

louse, rowooda. Natives eat them
lightning, rangadgea
leg, arnarama
leaves, wangie
lily root, mardarra. Excellent food
laughter (joy), wootoo
lagoon, mangowa
long, wandoowandoo
liar (see "gammon"), darwa ademonguinno
like, jinnalowangie
light, nabooloo
large, wardeerie
leaf, wangie
longer, wandoowandoora
life, bajallie

M

mouth, gnarwooloo
man, gnarminingeea
male infant, gnapadda
moon, gnacalla
mother, paradda
mountainous, weerie wardeerie
meat, oolungoo
make, nayabeema
mirage, waringoo

N

no, wamboo; (no! no!! wamboo wamboo)
near, kawookoo
nose, arnung wooroo
necklace, arnoomoonoo
new, teangoo
nimbus (black clouds), gnoowoo
nipple (breast), nocwoona
notched stick, woonda. A letter from one chief to another.
nothing, neegee

O

oyster, arngoolee
opossum, beewallie
ochre (yellow), narmarra
ochre (red), nargangoo
offend, narngawinnie (see angry)
open, narangya
orator, langoo. A native who talks a good deal.
orphan, nowoojiggie
often, arigilla
over, warbya

P

plenty, meetembangoo
pigeon, rarmarloowooloo
parrot, karbidgie
porcupine, rarbarlarra
poison? namarowa.
paddle, ryeemee
pain, tarnarookooringie
passion, warngawinnie
penis, dyimboo

Q

quick, tooloo
quail, rowoomulo
quarrelling, wanga

R

run, woolooma
rain, meewidgee
river, namananga
robber, gnarngina
rope, myemadda. Made from inner bark of Currajong
running water (fresh), wyarama, wyarrie
running water (salt)—
arlebee wyarrie wyarama
salt water running
red, oomalidgie
rock, woodowada

rainbow, loowa
refuse, tarba arnungoondarra. I refuse to give it

S

ship, nowoolga
snake, lewa
spear, moweradgie
sand, owarra
stranger, moonanga (white man)
skin, nereea
shield, myardooyadda
small, kookoodoo
sun, rarcamba
sky, gnow
shark, yeelmundie
sea, arnda
scrub (thick forest of small trees), warndeea
son, yongadooada
smoke, oolua
summer, ramardoo
stone tomahawk, rowilcongoo
sun down, tarnembya rarcamba
spear (barbed), moweradge pidgie
spear with stone head, mowerdowda. Half the word stone, half the word spear
stone, woodowada
salt water, arleebee wyarrie
salt, arawa
stop, parjeenmaya
sit down, yeepandarra
silence (hush !), larbonmya

T

tree, wondaree
thunder, jangabangie
this, madda
that, namanyadgie
they, narmboo
toes, arnweeridgie
tongue, arnunganda
to-day, looragoo
to-morrow, ecarra ecarra
teeth, arnamyee

U

under, arlpya
unwind, yinmya
understand, narlaya

V

venereal disease, jacama
virgin, jyalgwie
vagina, darwaroongoo

W

womera (throwing-stick), narleega
waddy or club, barkoo
white, oolawidgie
water, wyarrie
wood, moornimba
wind, lambidgie
where ? arnda
when, arndoo
why ? gnaroo
what, arlee
wallaby, woonaree
woman, arnanwya
wife, rangatarrawadoo
white man, moonanga (stranger)
wild turkey (bustard), tooladgie
whirlwind, boojumarra

Y

yes, yah
yonder, mambarnoo
yellow, tarngoorango
you, yarcarra
young, ardeeyangoo

I am hungry—arna wyndygoo
give me some food—tappa mongarra
I am thirsty—arna woondalla
give me some water—tappa wyarrie
give me some kangaroo — tappa woonallee
where is the water ?—arnda wyarrie
is the water permanent ? - patjeewa wyarrie ?
where is the creek ?—arnda yarla ?
show me the water—nejarra wyarrie
I will give you some food—keena mongarra
do not be afraid—parnee wardangya
I am not afraid—angya wyappa. [The idiom is changed, and only a portion of the word afraid is used.]
where is your camp ?—arnda mowa-langie ?
have you seen white man ?—arndara moonanga ?
I am going away now—bowitjee (going away) arna (I am)
you go away—bowitzee arcarra
I am very angry—arna weardie wanga
why are you angry ?—gnaroo (why) wanga (angry) ?
you make fire—melam bweega

Anthropological Notes on the Aboriginal Tribes of the Daly River, North Australia.

By the Rev. Donald Mackillop, S.J.

[Communicated by Prof. R. Tate.]

The Daly River tribes best known to us are the Cherites, the Ponga-pongas, the Mulluk-mulluks, and the Mat-ngelli. The Cherites, a small but intelligent tribe, occupy the land between the sea and the river on its right bank. Opposite them, on the left bank, is a powerful tribe called Wogites, of whom we know very little. Next to the Wogites, on the same bank, come the Ponga-pongas, whose language is just the same as that of the Cherites. Next to the Cherites, on the right bank, are the Mulluk-mulluks. Their language differs from that of the Cherites, yet only as one Greek dialect differs from another. This brings us more than 60 miles up the river. The Mulluks are also on the opposite or left bank. But a few miles inland and to the west, begins the region of the Mat-ngelli, or Hermit-hill tribe. The Mat-ngelli have the Ponga-pongas on their north. Their language, although in structure and idiom very similar, differs much from that of the other tribes mentioned.

All these natives are powerfully-built men, who have at times shown very great hostility to the whites. Indeed, some years ago they had the name of being the fiercest blacks of the Territory.

All these tribes intermarry. I should think that there was a time when the laws regulating marriage, so marked in other parts of Australia, obtained also among the Daly River tribes. At present they do not. A man may not marry a blood-relation, however remote the kinship be, but marriage within the tribe is permitted and common. Very often, however, the woman is of another tribe. Marriage by capture was certainly at one time the rule. Even now the phrase *to steal a lubra* is the only equivalent known to me for the phrase *to marry*. In their gesture-language, to clasp the left wrist with the right hand expresses the same idea. It is in fact *ducere uxorem*, but it means more than to lead the bride home; it is to lead her off captive.

Marriages, or rather espousals, are arranged by the old people, while the children are very young, sometimes even before they are born, but then, of course, conditionally upon the child being

male or female. A young man not so provided for must steal a lubra, either from his own tribe or from another. If from a strange tribe, he will be persecuted by her friends for a time, and if caught, he will have to fight for his lady with some man chosen from the offended tribe, or he will have to run a gauntlet of spears. I know a case where a man so captured refused to fight a single adversary. He told the friends of the stolen woman—the third or fourth of his wives—that if they wanted him to fight, they must bring out against him the two best men they had. They did so. It was a hand-to-hand fight with their great heavy lance-headed clubs. But so great was the strength, reach of arm, and skill of this man, that he very soon disarmed and nearly killed his two opponents. This was the notorious "long-legged Charlie," who turned Queen's evidence at the time of the great Daly River murder case.

If the young man steal his wife from his own tribe there will also mostly be a row, always, of course, should he take the wife of another man. In this case the injured husband troubles himself very little. Sooner or later the fugitives must return. Then he punishes them. They must submit, and he must have blood from both. He does not, as a rule, spear them in the usual meaning of the term, but prods them with a spear more or less severely as his wrongs have been greater or less. This, if he intends to spare the woman's life. She then returns to her lawful allegiance, and there is no more about it.

If you ask a young man how he came to be so silly as to expose himself to this certain vengeance, he will answer: "Lubra been kill'm me eye," which, translated, means that he was bewitched by the woman's eye. Whenever—and this often happens—the young man believes that a woman's evil eye overcomes his liberty, he resents the insult even should he yield to the tempter.

Riding once through the bush with a lad of about seventeen, he pointed out a hill which he had good cause to remember. It was about 20 miles from his home, and so far had he once escaped with the wife of a fellow-tribesman. He laughed heartily as he told me the story, how the woman was always pestering him to run off with her, how he told her he did not want her, that he was only a boy, that her husband would kill him, and how, overcome at last by her importunity, he said, "All right, you and me run away!" They had reached the hill in question. It was raining. They were seated on a stone, holding a sheet of bark over their heads. Suddenly the husband of the runaway stood before them. His spear was poised, and he looked murder. "If you were not of my own tribe, I would kill you now," he said. "Kill me," said the young fellow; "I have stolen your wife." "No, I will not; you are only a boy!" "Very well, beat me,'

said the other; and held out his head. He was beaten, but his head proved harder than the wommera, or throwing-stick, used to chastise his youthful folly.

Polygamy is practised, but not very commonly, and the men most respected in the tribe have only one wife. They are also as a rule very kind to their women, and receive in turn very great deference and obedience. It would be quite against the dignity of a Daly River man to carry on an angry dispute with a woman. Of course nature will out at times, and it is amusing then to watch the stoical black man. He will listen in silence to his Xantippe, at most yielding her a contemptuous shrug of the shoulder. Of course the woman grows bolder. After a while the man stands carelessly up, and with a well-directed blow on the head from a club, he fells his better half to earth. When she comes to she is again his loving and obedient wife. I remember a case, however, where a woman, one of two, happening to be of stronger build than her lord, took a cudgel herself, and gave at least as much as she received.

In these tribes a man is the natural protector of the wife of his dead brother. She does not necessarily become his wife, and may, if she will, return to her father.

A father's brothers are all called fathers by his children, and a mother's sisters are mothers. How far the Tamilian system obtains I have not yet discovered. The fact just mentioned may prove a starting point only. Certainly their system of relationship is intricate, and widely different from ours.

I might mention here that the man who gives a wife to another becomes related to that other. They are friends for life, and any injury done to the giver by the receiver would be a great offence against tribual law. I myself, the way things are going, will soon have no end of such relations. The blacks call me *ngan-larama*, or master of marriage. It came about in this way. As I mentioned already, children are often disposed of when very young. You will easily understand how injurious to our work this custom might prove. A girl, for instance, for years on the station, might in the end have to go off with some old rascal 30 miles away as his third or fourth wife. When they bring their children to us, the blacks surrender this tribual right of the head of the family in favor of the superior of the mission. Of course we never use this right, except with the full approval of the parties most concerned. They are human, and have their likes and dislikes. They know too—for we teach them so—that in this matter, they are free to choose within the limits allowed by our Church. To free them gradually from the tyranny of the old men we have to interfere for a time. But the young people are glad that we do this, and so far all has gone well.

Here is a case in point. A young girl who had been with us from a child—the best girl, in fact, on the station—wished to see me about some trouble or other. She was afraid of the wild blacks ; so was I, in her interest. I strongly advised her to marry. She laughed, and said she would rather remain free. I told her this could not be ; she was growing too big—we had yet no nuns on the station—for I verily believe her desires went in this direction. I reminded her that there were several eligible young Christians from whom she might choose. At last she gave me to understand that if it needs must be so, there was one young man to whom she would not object. I innocently advised her to tell him so. Then I was surprised indeed. She was horrified, and positively blushed—for blacks can blush. Such a thing could not be thought of, she said ; he must speak first. All I could obtain was permission to let the young man know the coast was clear, for his ambition would not have gone so high. This I did, and before many days I found they were engaged. I afterwards married them. They are a happy couple, and have their little farm. Of course, I am now their father ; but they have a special word signifying father in this relationship, and in speaking to them I should not say simply *child*, but should use the term which is correlative to that used by them when addressing me.

Circumcision is practised by all the Daly River tribes. A few refuse to submit to the operation. If able to escape the old men for a few years after the time—about fifteen—for the operation, they are left in peace. But for life they will be called *Larrikiyas*. The Larrikiya is the Port Darwin tribe, who do not circumcise. The mutilation practised on the Victoria and in other places to the south and south-west, I mean the slitting of the penis, is not known on the Daly. I wish to emphasise this fact, for I have heard the contrary maintained by a travelling doctor, whose only proof, given to me, was, " Why, man, I have read a paper on the matter to the Royal Society in England." So is history sometimes made.

The women have a curious mutilation. When young girls they remove the two first joints of the right forefinger. The operation is most artistically performed, judging by results. Yet they use no knife or, as when circumcising, sharp stone. They find in the jungles a very strong cobweb, and with a thin skein of this they tie tightly round the joint. The circulation is, of course, stopped, and after a time the dead joints fall off. This custom is far from universal.

In great sorrow they shave their heads.

The natives are undoubtedly cannibals, but then their cannibalism is peculiar and limited. Infanticide is very common, and

they often eat murdered babies. They seem to consider this the kindest way to bury the little ones, and only the nearest and dearest friends are allowed to partake of this repast. But they will not touch the head. They say the devil-devil, *i.e.*, the ghost or spirit, is in the head. They always bury it.

A blackfellow will always deny that his tribe practises cannibalism, but accuses every other tribe of the same. The Cherites once told me that the Ponga-pongas, not content with an odd baby, really fattened up girls for the shambles. About twelve years of young life were allowed them.

The natives tell us also that to the south-west there is a small tribe which inhabits a hilly and very poor country. It happens sometimes, especially through bushfires, that they are absolutely deprived of, and far removed from, all sources of supply. They go to sleep, the young men knowing well that before morning one of their number will be killed by the old men. Each hopes he will not be the doomed one. With the provisions so obtained the little tribe moves on next day to a more favoured locality.

When a child is to be murdered the doctor is called. The children believe the child to be really ill. While the doctor or executioner examines the child, a great "keen" is raised, during which he strangles the infant. These doctors are great rascals, and what is said of them in other parts of Australia might be repeated here. I saw one performing once. As he approached the sick man he looked to the sun, as if praying. Then he seemed to mumble some charm. He would continually draw his fingers through his opposite arm-pit, and rub the moisture so obtained into the body of the patient, blowing every now and again over the parts so rubbed.

But apart from these mummeries they do seem to know something of the curing art. They certainly go in greatly for *massage*, and I know by experience that they can give relief. In very violent cases of headache they bleed their foreheads. They are very temperate in the drinking of water, even on the hottest day. They say it is not good, and prefer a bath.

They attribute to the smoking of the dried leaves of the native yam—*amorphophallus*—the effects which we obtain from ether or chloroform. A short smoke makes one sleepy; if he smoke too long he will not awaken. While so sleeping he is, they say, unconscious of pain. On the other hand, although a species of chinchona tree is very common, they do not seem to know that this might be of use to them in the fever so prevalent in that marshy country.

Cases of cancer are frequent, and syphilitic diseases seem to gain upon them. As far as I know they have no word in their language for this disease. They seem also to have no cure. It

simply bewilders them. Strange as—considering all the circumstances—it may seem, I believe syphilis to be of recent origin among them. There are cases also of something very like leprosy. As a rule they die by murder, of consumption, or of old age.

When they do not bury their dead, they either burn their bodies, or put them up in trees until only the bones remain. These are then buried. The blackfellow, properly so-called, *i.e.*, who is neither old man nor woman, is entitled to the honour of being rolled up in paper-bark and placed in a tree. Terrible scenes may be witnessed during their burial rites. Here is one. A hole five feet deep—only that I insisted upon this they would not have gone deeper than two feet—the naked body of a dead man alongside. When all was ready they politely requested me to go away. I refused. They insisted, saying that they wanted to cry. When they found I would not go, a scene began which I shall never forget. The men divided into two lots, one to get the corpse into the grave, the other to prevent their doing so. I thought they would pull it to pieces. Meanwhile the women raised a terribly weird cry, and worked themselves into a real frenzy. They were armed with ironbark sticks, about two feet long, pointed at one end, and about one and a half inches thick at the other As they sang, they would beat their shoulders and backs with the thick end of this weapon, inverting it every now and again, and driving the point into the crowns of their heads, every such stroke being followed by a strong squirt of blood. It was terrible, and quite new to me. I snatched the sticks from the women, and watching for an opening, rushed in with a couple of strong young blacks, caught hold of an arm or leg of the dead man, issued a quick, sharp order, and before the opposing party had recovered from their astonishment at my interference we had dropped the body into the grave. Slowly to lower it was out of the question. Then amid most heartrending yelling they filled in the grave. One man remained sitting on its trunk until buried to the knees. The scene was so awful that children present ran away, looking back at intervals over their shoulders in most lively terror. And yet it was all acting. Except three or four of the dead man's near male relations, who, with heads over each other's shoulders, wept quietly apart, the grief of the others was a worked-up frenzy. When all was over, they went laughing away.

Very different are our Christian burials. And they have made a marked impression upon these very impressionable people. One of our young men near to death begged of me not to permit the blacks to bury him, and was quite joyful when I assured him he would get a happy Christian burial.

The natives do not believe in natural death, even when it be the result of accident. Every one is killed by the sorcery of another tribe. This fact, with the infanticide so widely practised, is in great measure the cause of the thinness of the population. It means practically the doubling of the death-rate. A man dies —it may be from snakebite. The snake was forced to kill him by the magic arts of some one in a hostile tribe. And some one of that tribe must die. The strange thing is that the tribe which so loses a member will not retaliate. They wait until one of their own people dies, when, of course, they too must have a victim. The rule is that the victim is murdered wherever found. But sometimes an embassy is sent and a victim demanded. I have heard of a case where a great man having died from snake-bite, and the old women having declared that the sorcery came from a tribe about a hundred miles away, such an embassy was sent. They demanded *pro gravitate causae* three victims, and were satisfied. I must say I do not believe this statement to be true.

It is of no avail to try argument by induction on this point with a blackfellow. You may tell him that his fathers have all died before him, that therefore he too must die. The most you will get him to admit is this: "They were sick; I am well; I shall not die."

The sorcery in question is of various kinds. This is the most common: "Wild dog. Blackfellow been take'm out fat." For years I laughed at this, and tried by ridicule to beat down the widespread belief. On one occasion a very intelligent Cherite got angry with me. He said you whites understand many things —you know how to make steam engines, fine houses, gardens, &c. —but this matter you do not understand. I was convinced from his manner that there was something behind it all which he could not make plain to me. If in ridicule I might ask: "Where is the hole through which the fat was taken out?" the answer would be: "No! you no more savey—him no more want im hole, that one doctor; him too much savey no more hole." I do not laugh at them any longer. I think I understand them. Rightly or wrongly, they believe that by magic arts the victim is thrown into a decline, from which death results. This, I am confident, is the meaning of "take 'm out fat."

I have said rightly or wrongly. For although in such matters I believe nothing which has not been absolutely proved, and which cannot by any scientific reason be accounted for—while I know that science will smile incredulously at my admission—I must nevertheless admit that facts have come under my observation which have—well, staggered me.

This brings me to the religion of these men. They believe in a being superior to themselves, but evil. If ever they pray to

him it is simply to let them alone. They would never dream of asking a favor of him. He is, and always has been, their bitter enemy. They have a ritual, a somewhat elaborate one too, but few, very few of them, know the significance of the rites they practise. I believe some few do. There seems to be a sort of freemasonry among them, and an inner circle, few in number, who alone know the meaning of their ceremonies. I believe, too, that these few could, if they would, reveal very much about their past history and traditions. But it is simply impossible to get any information from them. They are bound to secrecy, and I think death is the penalty should they reveal anything to the uninitiated.

I am about to make a strong assertion ; but I believe it to be true. I believe they have human sacrifices, that from time to time one man, with his own knowledge and consent, is offered in sacrifice for the good of his people—offered to the evil spirit whom they so fear. This is the leading feature in the great religious and highly immoral ceremony, which they celebrate every few years. They call it *Jaboi*. In some secluded place they form a ring, just like our circus rings, and of about the same diameter. Here young men to be initiated into some lower grades meet at midnight in charge of some of the inner circle mentioned. What there takes place no white man may witness. This rite lasts for about three weeks. Of course, we have collected many facts relating to this matter, but I do not consider that our knowledge is yet precise enough for publication. What seems certain, is that they undoubtedly worship in fear an evil spirit ; that sometimes they offer their fellow-men in sacrifice to him, and that the visible emblem, if so I may put it, of their religion, is the human penis.

Superstitions they have without number. The spirits of the dead live in the trees, and eat of their fruits. Rain is caused by the tribes from whose direction it comes, so also are the winds. A certain blackfellow goes up to the moon once a month to fight the evil spirit. If he did not do this, the evil one would kill the moon. "But this man cannot fly," I once argued ; "he has no wings." "Oh, the devil-devil brings him up," was the ready answer—to fight himself.

The doctors carry certain bones—I think of the devil-fish, which are serrated and over six inches long. Women and children are not allowed to see these bones, and the blacks fear them as they would loaded rifles. They call them *barrit*. The wounds produced by them never seem to heal ; they become like cancers. Indeed, the blacks call cancer *barrit*. They believe that a doctor, the holder of such a bone, can produce these sores even at a distance. To prevent stealing from our garden, an old man once

advised us to take a pannikin of water, and dipping a barrit-bone into it, to drop the water from its point along the garden fence. He assured us that then no black man would dare go over that fence. I felt half sorry that we could not lend ourselves to this superstition. A few miles from where we live, and not far from the river, there is a hill called, in Mulluk-mulluk, *alalk-yinga ;* in the Hermit-hill language, *verak-yinda*, *i.e.*, the place of the children. The natives believe that the souls of future children—or perhaps the children, bodies and souls—are shut up there. They are under the care of one old man. He has to see that they do not escape, and to supply them with water. This he does by means of an underground communication with the river about a mile away. The range, of which the hill in question is the last one, runs right to the river. When a child is to be born, this old man sees to the business. Laughing once over this matter, I said to a young man, "Well, if all this be true, you were once in the hill yourself?" "O, yes," he answered. "What sort of a place is it, then? You should know." "Ah! too much long time; me been lose'm," *i.e.*, I have forgotten.

Strange stories are connected with the stars and constellations. They sometimes group the fixed stars as we do ; often otherwise. The Pleiades are children who ran away from their tribe, and got fixed for ever in their present position. Every group seems to have its story. The sun returns to his eastern position by a route, so far to the south, that we cannot see him.

Each tribe has its own territory, and even within the tribe groups of families have their special headquarters. Men are supposed to supply the animal food, women the vegetable. The *lotus*, or large red water-lily, is very abundant, and during several months of the year they live entirely upon its roots. The seeds also of this beautiful plant are highly prized. They are similar in taste to green hazel-nuts. Pickled in brine we too very much appreciate them. Even the stems of this lily at certain stages are eaten, and taste, as they look, like rough celery. The large leaves form wrappers for various purposes.

These tribes go absolutely naked. The folds of the ubiquitous paper-bark give them blankets when they require them, roofs for their rude huts, dishes for their meat, tinder for their fire (producing) sticks, and receptacles wherein to carry very young babies. I have found that this paper-bark is enormously rich in gas, so much so that had we the necessary appliances we might with profit employ it to light up our "Reduction."

I just mentioned very young babies. In a very short time the little ones learn to ride, even asleep, on their parents' shoulders, their feet dangling in front. They never fall; indeed, there

seems as little danger of this as there is in the case of a young opossum on the back of its mother.

About their language I shall say little, as at some future date I hope to forward a paper on this subject to your Society. It is a beautiful language—or rather, contains the elements of a very perfect one. So philosophical is it, that it forces the conclusion that this despised race in times remote and in other lands was very much higher in the social scale than we now find it. Take only the question of gender. They have stolen a march upon us. They distinguish carefully between organic and inorganic nature. Whatever lives will live an animal or a vegetable life. If animal, the gender will be male or female; then comes the vegetable, or lowest form of life; then inorganic nature. A tree living belongs to the third gender; cut down it passes into the fourth. All adjectives capable of the inflection must agree with their nouns in gender, and the verb in the third singular has all four forms and must likewise agree in gender with its noun. The word *muelang* (shadow) is a beautiful illustration of the saying that the exception confirms the rule. It is the only exception known to me. It is of the third gender. The fourth gender always denotes a passive state. "The stone is on the ground" can only mean in this language "is inanimate on the ground." Now a shadow seems to move and of itself. Therefore I suppose they rank it with the lowest form of life. Fruits, as well as the trees producing them, belong to the third gender. The moon is masculine, the sun feminine. All this may seem surprising. But this is little. Their language abounds in highly metaphysical distinctions unknown to ours. The preciseness with which they express the different modes of being is astonishing. And yet because they translate one of these modes by *sit down*, it has been argued that they have no substantive verb! They have a verb *to be* in a sense to which we can lay no claim. It unites the perfections of the Latin or Saxon verb with those of the Celtic, and goes far beyond the powers of either. But I must not enlarge now upon this subject.

We have gained at last the complete confidence of these tribes. They are bright enough, and take very kindly to agriculture. If reasonably assisted, even if left unmolested with a sufficient territory, we could reproduce on the Daly River those "Reductions" which a recent writer, Henry George, says, "To their eternal honour, the Jesuits instituted, and so long maintained in Paraguay." All the elements necessary to bring about such a state of things are present in ever-expanding power, notably, to quote the same writer, "The only force that has ever proved competent for it—a strong and definite religious faith." Shall we succeed? Even in the interests of science, Australia should

enable, or at least permit, us to do so. But the odds are at least ten to one against us. Not from any unfitness on the side of the aborigines; not certainly from want of will, or through the failing of the spirit of sacrifice in the Society of Jesus; but, to put it kindly, because the Anglo-Saxon race is what it is. Proud in its present superiority, that race will remember the lessons of history only when an invading people shall have meted out to it the justice which it has shown to the helpless blackman. A hundred years, perhaps hundreds, may pass; but with the teeming millions of Asia at our door, who shall say no day of retribution will come upon Australia?

Descriptions of South Australian Brachyscelid Galls.

By J. G. O. Tepper, F.L.S.

[Read August 1, 1893.]

Plates III.-V.

The Brachyscelidæ, a family of Coccids, appear to be entirely endemic to Australia, only extending in an aberrant form to New Zealand. At present the family is composed of a limited number of genera, of which the typical one contains most of the described species. The family with three of the genera was established by Schrader in 1862 on material collected in New South Wales, several species being described and figured by him in the "Transactions of the Entomological Society of New South Wales," vol. I., pages 1-8. His descriptions are, however, unmethodical, and therefore unsatisfactory.

Quite recently Mr. W. W. Froggatt published a further contribution in the "Proceedings of the Linnean Society of New South Wales," vol. VII., series 2, pp. 353-372, of which he most courteously and obligingly sent me a separate copy. In this he re-describes intelligently Schrader's species (5), and adds eight new ones of *Brachyscelis*, mostly illustrated by excellent figures.

Finding that these two papers constituted the whole literature of the subject of Brachyscelid galls, and that the work containing Schrader's figures existed in the S.A. Public Library, I compared those in the collection of the S.A. Museum (mostly brought together by myself) carefully with the published descriptions and figures, and found that nearly all our S.A. species were more or less widely different, and therefore new and undescribed, and that even the few which might possibly be included in one of the other species, were more or less aberrant in detail. Being precluded by a Museum regulation from communicating specimens of, or information on undescribed species to extra-South Australian specialists, I have myself worked up the subject, and present herewith the results as a contribution towards a more complete work of the future. The illustrations have all been drawn from the type specimens by myself, and represent them as truthfully as possible. The species are all figured for the first time.

The Brachyscelid galls form undoubtedly some of the most

wonderful transformed vegetable products on account of their symmetry, or regularity of form. They are produced by a minute, almost microscopic, insect lodging itself at the apex of an embryo-bud, either of a lateral, or terminal branchlet, flower, or seed vessel, and these grow around and over the insect in a fixed form, according to each species, instead of assuming simply an abortive form of their original habit, as in so many cases of other gall-forming insects. Each terminates one of the axes of the hostplant, be these twig, leaf, flower-bud, or young seed-vessel, and each contains only one of the originators in the genera *Brachyscelis*, *Sphaerococcus*, *Cylindricoccus* and *Frenchia* (the three last established by Mr. W. M. Maskell, but their position left undetermined, Trans. N.Z. Inst., 1891), while in *Opisthoscelis* and *Ascelis* they are formed by the bulging out of the foliolar epidermis on one or both sides, and the space surrounding the insect filled by spongy, endodermic tissues.

The originating insects themselves (*i.e.*, within the same genus), as already remarked by Schrader, present such slight differences that they are almost unavailable for identification, and the working out of the causes producing the varied result in respect of the species will no doubt provide some future biologist with some most interesting study.

All Brachyscelid galls have a small or even minute opening or aperture at or near the centre of their summit, or exceptionally in the base. This communicates by means of a narrow channel of various lengths with an oval, oblong or cylindrical cavity, which is either more or less completely filled by the occupant, or more or less in excess of its size, and then usually more or less occupied by a fluffy, waxy exudation. The galls of the two sexes are widely differing in form and size. The male galls are always very much smaller, more or less elongated, forming cylindrical or conical tubes, and are either on the leaves, young twigs, or (rarely) on the female galls, occurring either singly, distantly scattered, in crowded clusters, or irregularly. The perfect male insect is described as being very minute, ranging from one-eighth of an inch to one-sixth, furnished with a pair of wings, perfect legs and antennæ, and two long anal setæ, or fine hairs. They have only been observed in a few species (no South Australian), and of some species even the male galls are still unknown.

The female galls, on the contrary, are mostly of very much larger size, of definite form for each species, and either placed singly on branchlets or forming crowded clusters on their terminations. In the latter case the galls are usually more or less distorted. A characteristic specific difference appears to be exhibited in the direction of the axis of the gall—that is, whether more or less vertical, lateral, or dependent. It seems self-evident

that this must be in reference to the established habit of each kind, and that it is essential to the wellbeing of the insect that its head, which is always directed to the point of attachment, *i.e.*, the *base* of the gall, either bear the weight of its body, or be relieved of it when lateral, or that the posterior end in pendant galls bear that weight.

A sectional difference appears to be afforded by the type of the form, *i.e.*, whether regular or symmetrical; in the former case all longitudinal sections are normally alike, in the latter only one such will produce similar halves—irregularity is always the result of abortion. The above differential characteristics I propose to use as a convenient artificial classification of the galls until further knowledge of the insects themselves may furnish a better one.

The female insect varies in form from broadly turbinate to elongated fusiform in the genus *Brachyscelis*. The head is completely fused with the thoracic segments, and separately undistinguishable; it is, therefore, included in the term "thoracic part of the body," and is usually thick and forms the greater portion of the bulk. There are eleven dorsal segments besides the last, which is very small and bears two subparallel, horny "tail bristles" of varying length. The segments are more or less constricted at their junction, those of the abdomen decreasing rapidly in diameter to the acute apex, and are either quite smooth, armed with short spinelets, or (especially those of the abdomen) more or less clothed with fine, sometimes rather long, hairs. Ventrally six, very short, three-jointed, widely separate legs are placed near the margin; the forelegs near the anterior extremity are the shortest; a little behind, and forming a triangle with them, is placed the minute mouth, or what is considered as such. Schrader says that "he could not detect the promuscis in his specimens, and was in doubt whether an opening existed," but in a large, fine specimen of my *B. ovicoloides* the latter appears to be quite distinct under a strong double lens, and Mr. Maskell describes the oral parts very succinctly in his genera. More in front and laterally the very short antennæ are placed near shallow, more or less indistinct, impressions considered as "eye spots." The former I have not been able to detect in the above specimen. The hindlegs are the largest, the forelegs shortest, and the others intermediary; all consist of three joints, the basal one being very much thicker than the others, the last very minute, bearing a minute simple claw. The colour in *Brachyscelis* is usually a paler or darker rusty-yellow or brownish tint, the terminal bristles being dark-brown or black. When alive the whole body is surrounded by a whitish, fluffy substance, exuded from the surface, of a waxy nature apparently, and which almost entirely dissolves in alcohol.

These remarks refer more especially to the above-named species, but apply more or less to all others. I have not myself observed the earlier stages, but Schrader states (l.c.) that the male impregnates the female through the narrow opening, and that she finally becomes a mere mass of eggs enclosed by the bare skin; that the young larvæ (l.c., i., figs. *h*, *b*) are microscopic, very active, flat, oval, margin fimbriated, with rather long, curious antennæ, and two very long terminal filaments.

Some species of *Brachyscelis* (perhaps all) are very prone to be affected by parasites, and not only the insects themselves, but the galls formed by them. The latter thus become very much distorted, and their form greatly modified. Examples are shewn on plate iii., fig. 1*g*, and plate iv., fig. 1*g*, fig. 2*f*. This action is so predominant in some instances that the host becomes stifled, the inner cavity wholly obsolete, and the shape so irregular as to be past recognition if seen by itself. Several species of Hymenoptera (inclusive of Chalcids), Coleoptera (*Scymnus*, *Haplonyx*, &c.), and a moth in chrysalis stage have been bred from some of the Mallee species. This prevalence of parasitism is no doubt the cause of the comparative rarity of most of them (except locally), notwithstanding the extraordinary protection of the prolific female.

Regarding duration of life of gall or insect nothing definite seems to be known. According to my own observations, the attainment to full size of the larger woody galls may require several years, the life of the female probably depending upon the access of males either earlier or later. Fecundation resulting, as is well known, in accelerated development and early death, and vice versa, among the *Articulata*.

In respect of distribution of *Brachyscelis* in South Australia, it may be remarked, that although I am familiar with them for nearly a lifetime, they were not found abundantly, except in isolated instances. The Mallee Eucalypts (*E. gracilis*, *dumosa*, *uncinata*, *oleosa*, and *incrassata*) furnish most of our species, while *Eucalyptus leucoxylon* harbours two, and *E. rostrata* three (one not yet described and figured) kinds. The Brachyscelid gall on *Beyeria opaca* (pl. v., fig. 3) is the first instance of such outside of Eucalyptus, hitherto the exclusive host, but it may prove to belong to another genus, when the gall-forming insect becomes known.

Classification of the Family.

Schrader divided the Brachyscelidæ into three genera. As his paper is long out of print, the following extract will perhaps be very acceptable to students of the family. He says on page 6 :—"I propose to divide the gall-making Coccidæ as follows :—

"1. Genus Brachyscelis. Where the females have six legs completely, but short and unfit for use.

"2. Genus Opisthoscelis. Where they have only two long posterior legs.

"3. Genus Ascelis. Where there are no vestiges of legs.

"The galls of the insects of the genus *Opisthoscelis* are often found male and female under the same leaf (plate v., *n*). The female gall is in the shape of a pea, but somewhat larger; the male galls very small and conical.

"The female *O. subrotundata* (iii., *n*) is of a crimson colour, nearly round, but the terminal segment of the abdomen very much tapered; it has very long posterior legs, but no traces of the anterior and intermediary legs. In another species, *O. gracilis*, the ovipositing female is rather slender, and the legs still longer and thinner, and the male has no anal setæ. . . The larvæ resemble those of *Brachyscelis*, but have very short anal setæ. . . .

"In *Ascelis* the female larvæ alone form galls. The male larvæ undergo metamorphoses in the gall of the female. This is of pale-yellow colour, and loses nearly all traces of articulation. Only dark spots occur in place of the feet. On the back the animal has a horny instrument with three points, always holding some gum between them, which seems to serve for closing up the hole. The opening of the gall is not at the top, as in *Brachyscelis*, but on the other side of the leaf. The larva (plate iii., *n*) is flat, and transparently yellow, resembling that of *Brachyscelis*, but is never pointed at the apex, has shorter antennæ and setæ, and not as much fringing hair."

All the larvæ of the three genera have six short legs.

In 1891 Mr. W. M. Maskell (Trans. N.Z. Institute. Zool., 1891, pp. 39-45, and pp. 52-60) added the genera *Frenchia* (on Casuarina) and *Carteria* (on Melaleuca) to the Brachyscelidæ, and described and figured *Sphærococcus* and *Cylindrococcus* (also on Casuarina) as of uncertain position (but has lately formed a new sub-family, Idiococcinæ, for their reception). On account of a general similarity of habit, I consider that they should also be included in the family. The first and two last form woody galls similar in structure to those of *Brachyscelis* (on Eucalypts and *Beyeria*); the second forms only thick waxy tests.

The adult female of *Frenchia* is tadpole-like, the abdominal portion being very long and slender, the thoracic very thick, circular, disk-like. Antennæ and legs absent. Colour reddish-yellow to dark-brown. Larvæ elongated, flat, subelliptical, with legs and antennæ (l.c., pl. xiii.).

Of *Sphærococcus* the adult female is globular, grey in front, dark behind, with very small antennæ, but no feet. Larvæ

elliptical, elongated, abdomen rounded, with legs and antennæ (l.c., pl. viii., figs. 8-20).

Of *Cylindrococcus* (pl. ix.) the female is cylindrical, sides parallel, truncate in front, rounded behind, of red colour, antennæ short, conical, only the anterior legs developed, remainder merely indicated by dark patches. Larvæ with six long legs and two anal setæ.

In *Carteria* the thoracic part of the female is very large, subquadrate (the abdomen being very much and suddenly contracted, very much shorter than the former, and truncate), with two tubes and a horny spine dorsally, but without legs and antennæ. Colour red. The larvæ possess antennæ and long legs (l.c., pl. xii., figs. 1-10).

Mr. Maskell's descriptions and figures are exceedingly clear and painstaking, and I am very much obliged to him for his courtesy in remitting to me separate copies of his very valuable and authoritative papers.

Taking into account only what appears to be leading general characteristics, the family, as far as now known, may be synoptically epitomised as follows :—

FAMILY BRACHYSCELIDÆ.

Females large, inhabiting through life singly woody or spongy galls of more or less regular or symmetrical form, or rarely covered only by thick, waxy tests. Male larvæ in separate small galls or associated with the females ; adults two-winged, minute.

1. Galls woody or spongy (on *Eucalyptus*, *Casuarina*, *Beyeria*).

2. Galls woody, developed in branches and twigs.

3. Female provided with legs, completely or partially.

4. Female provided with complete set of legs, three-jointed. (Body oval or fusiform ; antennæ very short ; on *Eucalyptus* and *Beyeria ?*) BRACHYSCELIS, *Schrader.*

4.4. Female provided with incomplete set of legs, remainder indicated by dark spots. (Body cylindrical ; antennæ short, conical ; on *Casuarina.*) CYLINDROCOCCUS, *Maskell.*

3.3. Female without legs (on branchlets of *Casuarina).*

4. Body of female globular ; antennæ distinct.
SPHAEROCOCCUS, *Maskell.*

4.4. Body tadpole-like, with two tubercular appendages, and a horny spine dorsally ; antennæ absent. FRENCHIA, *Maskell.*

2.2. Galls spongy or leathery (on leaves of Eucalyptus).

3. Legs present in the female ; hindlegs very long, remainder obsolete. (Body round anteriorly, tapering much behind ; antennæ none.) OPISTHOSCELIS, *Schrader.*

3.3. Legs absent. (Body subglobular, with a three-pointed horny appendage dorsally.) ASCELIS, *Schrader*.

1.1. Galls not formed ; females covered by thick, waxy tests. (Thoracic part of body very bulky, abdominal short, narrow, truncate, antennæ and legs absent.) CARTERIA, *Maskell*.

Although the present paper is primarily concerned with the genus *Brachyscelis*, I have illustrated a species of leaf-gall (pl. iii., fig. 4) which by its external form belongs to *Opisthoscelis*, but the inhabiting insect—so far as I have been able to study it in some soaked and re-softened specimens—differs considerably from the females of that genus, and approaches *Ascelis* by the entire absence of legs. Hence I feel considerable diffidence in locating it with either, and place it only provisionally in the latter for the present, having some other species to notice in a future paper.

In the following list I have attempted tentatively to classify the galls of the genus *Brachyscelis* in regard to form and the position normally assumed by the insect during life, but the latter only applies more reliably to the species observed by myself, that of the others being inferred from the published figures, which may not have been drawn with strict regard of the position of the galls in situ, but rather to the available space. The authors rarely mention it in their remarks. In the present illustrations, which I have drawn from specimens gathered by myself chiefly, the direction of the branchlet indicates a more or less vertical one, whatever its position on the plate. (The figures of the galls of the Elder Exploring Expedition will be given on another plate with those of some others, yet undescribed in the collection at a future paper.)

LIST OF KNOWN GALLS OF BRACHYSCELIS.

A. Galls regular. (All longitudinal sections through the axis produce similar halves.)

a. Galls more or less erect.

Brachyscelis munita, Schrader. On *Euc. robusta* (Frogg.), N.S.W., Victoria, Queensland ; on *Euc. leucoxylon*, *gracilis* (Tepper), S.A.

regularis, sp. n. On *Euc. rostrata*, S.A.

subconica, sp. n. On *Euc. uncinata*, S.A.

urnalis, sp. nov. On *Euc. gracilis* (var. ?), S.A.

calycina, sp. n. On *Euc. oleosa (?), dumosa*, S.A.

Neumanni, sp. n. On *Euc. dumosa*, S.A.

Beyeriæ, sp. n. On *Beyeria opaca*, S.A.

a.a. Galls lateral or dependent.

b. Galls normally lateral.

Brachyscelis pomiformis, Frogg. On *Euc.* sp., N.S.W., W.A.

ovicola, Schrader. On *Euc. gracilis, leucoxylon*, N.S.W., Victoria.

Bäuerleni, Froggatt. On *Euc.* sp., N.S.W.

rugosa, Froggatt. On *Euc.* sp., N.S.W.

strombylosa, sp. n. On *Euc. incrassata*, S.A.

b.b. Galls more or less dependent.

Brachyscelis minor, Froggatt. On *Euc. hæmastoma*, N.S.W.

conica, Froggatt. On *Euc. viminalis*, N.S.W.

B. Galls symmetrical. (Only one section along main axis produces similar halves.)

a. Galls mostly directed laterally in the normal form and position.

Brachyscelis variabilis, Froggatt. On *Euc. piperita*, N.S.W.

pharetrata, Schrader. On *Euc. Sieberiana, corymbosa*, and *capitellata*, N.S.W.

Thorntoni, Froggatt. On *Euc.* sp., N.S.W.

ovicoloides, sp. n. On *Euc. incrassata*, S.A.

a.a. Galls mostly dependent.

Brachyscelis duplex, Schrader. On *Euc. spec.*, N.S.W., Queensland.

pileata, Schrader. On *Euc. piperita, Sieberiana*, and *capitellata*, N.S.W.

glabra, sp. nov. On *Euc. rostrata*, S.A.

ellipsoidalis, sp. nov. On *Euc.* sp., Fraser Range, W.A. (Elder Exploring Expedition).

The following works have been consulted and made use of :—

1. H. L. Schrader—"Observations on Certain Gall-making Coccidæ of Australia," in Transactions of Entomological Society of N.S. Wales, 1862, vol. I., pp. 1-5. "Further Communications on the Gall-making Coccidæ," *ibid.*

2. W. M. Maskell—"Further Coccid Notes, with Descriptions of New Species, and Remarks on Coccids from New Zealand, Australia, and elsewhere," in Transactions of New Zealand Institute, 1891, I. Zoology, pp.1-67.

3. W. W. Froggatt—"Notes on the Family Brachyscelidæ, with some Account of their Parasites, and Description of New Species," in Proceedings of the Linnean Society of N.S. Wales, Series 2, vol. VII., 1892, pp. 353-372.

DESCRIPTION OF S.A. SPECIES OF BRACHYSCELID GALLS.

Brachyscelis munita, *Schrader.*

(Trans. Ent. Soc. N.S.W., 1862; vol. I. 5; plate ii., fig. *A*, *h*, *l*, *o*, *s*.). (Plate iii., fig. 1).

The typical form as described by Schrader is shown in outline by *A*., fig. 1, plate iii., which is an approximate copy of the original figure, and has not been observed by me in South Australia. The shape usually seen is delineated by fig. 1, *B*. The four prolongations, continued along the gall as more or less crest-like ridges attain sometimes several inches in length, but are always much recurved or contracted irregularly. When occurring in crowded clusters, as is sometimes the case, the galls become mostly very much deformed. Some of the ridges or all of them become obsolete, and the appendages less in number and much reduced in length and thickness (in my opinion they probably represent midribs of four leaves composing the gall), yet the typical form can still be recognised. The variety shown at *C* (pl. iii.) appears to be rare, and only appearing solitarily. It might be distinguished as *var. foliosa*, and is only met with on very young shoots with broad leaves indicative of immature age. A form very much reduced in size occurs by no means rarely on certain "Mallee" Eucalypts (*D*, pl. iii.; fig. 2*h*., pl. iv.), which I propose to distinguish as *var. reducta* until its relationship be more closely studied.

The male galls are narrowly tubular, small, and crowded together in subglobular clusters of very numerous individuals at the ends of small branchlets.

Habitat.—Distributed throughout Southern and Eastern Australia.

Brachyscelis regularis, *spec. nov.* (Pl. iii., fig. 3, 3*a*.)

Female gall. Solitary, erect, regular, conical both ends; apex truncate, slightly narrower than the base, the stalk of which is somewhat elongated and generally attenuated as well as the apex. Aperture very small, circular, level with the narrow rim, which is slightly and very shortly annulated. Exterior nearly smooth, whitish or brownish, slightly striated and roughened by low irregular, subconical protuberances (remains of male galls?), and transverse ridgelets. Internal cavity comparatively narrow, tapering almost equally towards either end. Insect not observed. Male galls unknown.

Length of gall, 56 mm.; diameter (max.), 21 mm.

Habitat.—Murray Bridge, Lyndoch, &c. On *Eucalyptus rostrata*, Schlecht; rather rare.

Brachyscelis subconica, *spec. nov.* (Pl. iv., fig. 1.)

Female gall. Solitary or in pairs, often several or many on the same leafy branchlet, but not crowded; regular, conical on both ends, apex at first acutely pyramidal, finally obtuse, furnished with several distinct annulations. Aperture circular, mostly minute, rim very narrow. Exterior green, longitudinally striated, smooth, finally greyish-black or brown, more or less scaly rugose. Cavity cylindrical, anteriorly funnel-like, posteriorly semicircular. Female insect small, narrowly fusiform, tail-bristles moderately long.

Length of gall, 25–30 mm.; diameter do., 8–10 mm.

Male gall. Narrowly tubular, distinctly curved, rim dilated; mostly turned downwards or sideways; yellowish-green to red; either almost singly or crowded in rows on the leaves near the female galls, usually much more numerous on one surface than on the other. Insect not seen.

Length, 4–10 mm.; diameter, 1–1·3 mm.

Habitat.—Murray Bridge. On *Eucalyptus uncinata*, F. v. M.

The species is not uncommon in the Mallee scrub near the locality, and may occur elsewhere. In its erect habit, and more elongated, slender form it differs from *B. conica*, Frogg., which, according to his figures, is more or less dependent. The respective male galls present also a different habit, being developed on the leaves, while those of the latter are situated on the branchlets.

Many of the female galls are found so crowded with chalcid parasites that they become wholly unlike the original, and in some cases the originating insect has been choked, the cavity disappearing.

Brachyscelis urnalis, *sp. nov.* (Pl. iv., fig. 2.)

Female gall. Very regular, mostly solitary, rarely two to four crowded together at the ends of small twigs; urn-shaped, basal part obconical, base narrow usually (rarely incrassated), neck more or less conical, narrow, elongated; rim wide, flat, formed of obtuse, irregular, divergent lobes; inner disk slightly depressed or raised, colour mostly brown; aperture central, very minute. Exterior nearly smooth, slightly striated longitudinally, brownish green or grey. Cavity cylindrical with long narrow channel anteriorly. Female insect small, elongate fusiform, hairs long, tail bristles moderately long, very slender.

Male galls. Very small, scattered along the small twigs near the females, not crowded, conico-cylindrical, apex not dilated. Insects not seen.

	Male.	Female.
Maximum length of gall ...	2–3 mm.	18–25 mm.
Maximum length of neck ...	—	3– 8 "
Maximum diameter of gall ...	0·7-1 "	5–14 "
Maximum diameter of neck...	—	2– 3 "
Maximum diameter of rim ...	—	6– 8 "

Habitat.—Murray Bridge, South Australia.

These are the most beautifully-shaped galls known to me, and occur on a stunted species of Eucalypts allied to *Euc. uncinata* and *Euc. gracilis*, but differing from either, and not agreeing precisely with any described kind. The seed-vessels are mostly prominently four-keeled, and the rather small flowers reddish to crimson. Many of the galls are more or less abortive through excessive attack of minute hymenopterous parasites, others exhibit a large, more or less laterally placed hole, showing the exit of some larger parasite, which had fed upon the inhabitant itself. Associated with this species are found small, more or less abortive galls of *B. reducta* (pl. iv., fig. 2*h*.) The specimen shown at "a," and remarkable for its broad, clasping base, was still green when picked, and the only one of this form met with.

Brachyscelis calycina, *spec. nov.* (Pl. v., fig. 1*a–d*.)

Female gall. Solitary, rarely a few together, regular, cup-shaped, sessile on the sides or ends of branchlets, obliquely erect; base broad, sometimes an incrassated ring, gradually dilated to the irregularly dentated rim; disk depressed, an elevated small cone in the centre, exceeding the rim, and containing the minute aperture. Exterior rough, dark-brown, disk blackish. Cavity oval, channel moderately long, tubular. Insect not seen alive, in dead specimens, fusiform, about half an inch long, pale ferruginous, two last abdominal segments very slender; tail bristles black, nearly as long as the two last abdominal segments together.

Male gall. Almost cylindro-tubular, very slender, nearly straight, pale-green, rim not dilated. Scattered along and around very young twigs, never on leaves.

	Male.	Female.
Maximum length of gall ...	2 –3 mm.	15–25 mm.
Maximum diameter of base	0·7–1·0 "	4– 8 "
Maximum diameter of rim ...	—	9–15 "

Habitat.—Murray Bridge, Goolwa, Kangaroo Island.

These remarkable galls occur on stunted bushes of *Eucalyptus dumosa* and *E. oleosa*. When young and still green and immature they resemble the corresponding stage of some of the individuals of the next species, but are never crowded. They are also found occasionally much parasitised and abortive.

Brachyscelis Neumanni, *spec. nov.* (Pl. v., fig. 2*a–d*.)

Female gall. Semi-erect, aggregated in dense clusters of many individuals of both sexes, flexuose-cylindrical, base surrounded by a thicker ring, middle slightly bulging, slightly contracted below the rim, latter not much dilated, often divided into two parts by deep incisions, always irregularly dentate; disk slightly depressed,

central cone scarcely raised above the outer margin, aperture minute. Exterior reddish brown, somewhat glossy, striated longitudinally and irregularly rugulose. Cavity elongate cylindrical, base either semicircular or the lower part greatly contracted; apical channel short and more or less funnel-like. Insect not observed.

Male gall (?). Tubular to trumpet-shaped, apex much dilated, rim dentate or lobate, recurved, with a small central cone; intermixed with the female galls in the same clusters. Insect not known.

	Male.	Female.
Maximum length of gall	8 –25 mm.	18–30 mm.
Maximum diameter at base ...	1·5 "	5– 9 "
Maximum diameter in the middle	1·5– 2 "	8–10 "
Maximum diameter of the rim ...	3 – 5 "	9–11 "

Habitat.—Murray Bridge. In large clusters on the erect or suberect stout branchlets and twigs of *Eucalyptus dumosa*, causing the death of the branch on which they are situated. The species is named after my old friend Mr. J. G. Neumann, who resides at the locality named, and has always assisted me and other friends of natural history most disinterestedly in the pursuit of researches in his neighbourhood, and has also liberally contributed to the collections of the S.A. Museum.

Brachyscelis (?) Beyeriæ, *spec. nov.* (Pl. v., fig. 3*a–f.*)

Female gall. Solitary, on the end of branchlets of *Beyeria opaca*, rarely in pairs, oval, or sometimes subfusiform, composed of the fused altered leaves; apex slightly elongated, or chiefly occupied by the comparatively large aperture. Exterior greenish when alive, smooth, marked by the edges and midribs of the leaves denoted by slight ridges. Cavity elongate ovate; channel short, large. Insects not known.

Male galls. Several together along the branchlets below the female galls, minute, tubular, curved. Insect not known.

	Male.	Female.
Length of gall	1·5–2 mm.	11–22 mm.
Diameter of gall... ...	0·5–1·0 "	5– 8 "

Habitat.—Ardrosssan, Yorke's Peninsula.

This species, if it be a true *Brachyscelis*, would be the first instance of such occurring outside of the genus Eucalyptus, the plant belonging to the Euphorbiaceæ. On account of the similarity of type form of the galls, I insert it here provisionally, as the insects are unknown. Their study will probably necessitate its removal to a separate genus. The specimens from which I have draw the figure were gathered by myself in 1885.

Brachyscelis strombylosa, *spec. nov.* (Pl. iv., fig. 3*a–c.*)

Female gall. Solitary, suborbicular, sessile, often more or less oblique and turned in the direction of the branchlet. Exterior, when young, formed of numerous, subconical or subarbicular tubercules, which become more irregular with age; apex truncate, crateriform, central cone lower than the margin; aperture small, usually circular, sometimes oval. Cavity large, broadly oval, inner surface somewhat irregular, channel funnel-like, short. Insect not known. *Male galls* not observed.

Length of gall, 18–26 mm.; diameter of gall, 20–25 mm.

Habitat.—Murray Bridge. These galls occur sparingly on the stouter branches and branchlets of *Eucalyptus incrassata*, and are so firmly fixed, that they can only be detached with some difficulty, being themselves very firm and woody. The outer walls are very thick and solid, and are mined by fair-sized larvæ, apparently of some weevils. A specimen of a *Haplonyx* was doubtfully bred from one of them.

Brachyscelis ovicoloides, *sp. nov.* (Pl. iii., fig. 2*a-f.*)

Female gall. Solitary, nearly sessile, elongate oval, always curved much and obliquely away from the point of attachment, and frequently much curved dorsally (much more even than in the figure, pl. 1*a*); exterior bright-green, like the leaves, slightly wrinkled longitudinally; apex truncate, brownish, rim flat, broad, centre of disk slightly depressed, without central cone; aperture small, circular. Cavity ovate, smooth, channel short, funnel-like; walls of equal thickness throughout, and composed of three layers, viz., (1) exterior, thin, green, bark-like; (2) intermediary, thick, formed of conspicuous cavities filled with a viscous gummy substance when fresh; (3) innermost, thin, whitish, composed of longitudinal fibres.

Length of gall, 23–35 mm.; diameter, middle 13–16 mm., apex 4–7 mm.

Female insect piceous above; a pale, broad, undefined, longitudinal patch on the anterior part of the dorsum; underside dark shining brown or black, last four abdominal segments yellowish, apex brownish; anterior part of body smooth, abdomen with short, distant bristles. Head indistinct, antennæ and eyes obsolete apparently. Legs six, three-jointed; basal joint much larger than the following, terminal joint with a very minute simple claw. Anterior pair smallest, posterior largest. Terminal bristles two, very short.

Length of body, 23 mm.; of head and thorax, 13 mm.; of anterior legs, 0·6 mm.; of posterior legs, 1·5 mm.; of terminal bristles, 1 mm.; width of thorax, 10·7 mm.

Male galls. Solitary, scattered or crowded on the leaves, or

singly sometimes on the green seed-vessels; cup-shaped to tubular, thick, apex more or less dilated, green to reddish-brown.

Length, 3–6 mm.; diameter in the middle, 2·5–3·5 mm.; at apex, 3–3·7 mm.

Habitat.—Moonta, Yorke's Peninsula *(T. Jones).*

The galls are found scattered on the branchlets of *Eucalyptus incrassata*, and perhaps *E. odorata*. They appear to differ from *B. ovicola*, Schrad., by being symmetrical instead of regular in form, much more curved, and the apex almost flat, the insect itself differing in colour, size, &c. Fig. "*d*" shows the view of the inside above the dotted line of "*a*."

Brachyscelis glabra, *spec. nov.* (Pl. iii., fig. 4.)

Female gall. Solitary, sessile, considerably projecting beyond point of attachment posteriorly, ovate, nearly smooth, faintly striated longitudinally, and sometimes with irregular, smooth warts (male galls ?), whitish or grey, clouded with brown; apex rounded, aperture very minute; cavity rather large, corresponding in form with the external shape. Insect not known, nor the male galls.

Length, 28 mm.; diameter over attachment, 15 mm.; at apex, 3·5 mm.

Habitat.—Mount Lofty Ranges, Lyndoch, &c. On stout branchlets of *Eucalyptus rostrata*, but rather rare, and always solitary. The outer texture resembles that of the bark of the branches very remarkably.

Ascelis, *Schrader.*

Female without legs. Galls globular or subglobular, spongy or leathery, smooth when fresh; extending either to both sides equally, or situated wholly on one side alone, in which case the opening is through the lamina of the leaf (?).

Ascelis (?) multitudinea, *spec. nov.* (Pl. v., fig. 4.)

Female gall. Obovate orbicular (when fresh), smooth, green, wholly on one side of leaf, aperture scarcely perceptible when young, at or near summit, conspicuous when mature. Circular area at base small, depressed on opposite side of leaf.

Female insect yellow, rather flat, elliptical, slightly covered with long hairs; segments distinct, constricted, margin conspicuously lobate, head subanterior, mouth in a circular slightly protruding area; antennæ dorsal, very minute, close together, conical, blackish. Legs, none. Stigmata conspicuous as black points, slightly raised above the surface (in old and softened specimen); last segment of abdomen deeply emarginate, the sides forming thick, obtusely acuminate appendages, without bristles or setæ.

Length of gall, 8–11 mm.; diameter of gall, 6–9 mm.; length of insect, 3·5 mm.; width of insect, 2 mm.

Habitat.—Marino, South-Eastern District of South Australia.

The specimen in the collection of the S.A. Museum was presented by Mr. A. Molineux, the genial and zealous Secretary of the Bureau of Agriculture, from the above locality, in March, 1885. The numerous galls (54 in all) are distributed over a large, not quite perfect, leaf of one of the "Stringybark" gums, and arranged in short, more or less irregular, rows of three to five, but not crowded. They resemble the galls of *Opisthoscelis* in form and the position of the aperture, but the insects differ from those of the latter genus in form of body and entire absence of legs, and from those of *Ascelis*, as limited by Schrader, also in form of body and the absence of the trispinose dorsal appendage. More and fresher material is, however, required for critical examination before a conclusive decision respecting the position of the species can be arrived at.

EXPLANATION OF THE ILLUSTRATIONS.

Plate III.

Fig. 1. *Brachyscelis munita*, Schrader. Female galls. Nat. size.
- *A*. Typical form; outline of Schrader's figure.
- *B*. Usual form with narrow contorted appendages.
- *C*. *Var. foliosa*, var. nov., with leaf-like appendages.
- *D*. *Var. reducta*. Small form on mallee Eucalypts.

Fig. 2. *Brachyscelis ovicoloides*, spec. nov. Male and female galls. Nat. size.
- *a*. Normal form of female galls on twigs; young and mature form.
- *b*, *b*, *b*. Normal form of male galls in various stages on leaves.
- *c*. Male gall on seed vessel.
- *d*. Dorsal half of female gall, showing form of cavity.
- *e*, *f*. Dorsal and ventral view of female, nat. size.

Fig. 3. *Brachyscelis regularis*, spec. nov. Female gall. Natural size.

Fig. 3*a*. Abortive form of same, through parasites.

Fig 4. *Brachyscelis glabra*, spec. nov. Female gall. Natural size.

Plate IV.

Fig. 1. *Brachyscelis subconica*, spec. nov. Natural size.
- *a*. Old, dry female gall, roughened by tubercles.
- *b*. Living female gall, more than half-grown, showing annuli at apex.
- *c*, *d*. Young galls in various stages (contorted).
- *e*. Solitary; *f*, aggregated male galls.
- *g*. Parasitised and abortive female gall, affected by Chalcids.

Fig 2. *Brachyscelis urnalis*, spec. nov. Natural size.
a. Abnormal sessile female gall.
b. Aggregated abnormal galls, distorted and bored by parasites.
c. Normal female gall (bored by a parasite at the side of the cone).
d. Young female galls.
e. Male galls on twigs.
f. Abortive female galls, affected by Chalcids.
g. Section of female gall.
h. Small abortive galls of *B. reducta*.
i. Female insect, underside.

Fig. 3. *Brachyscelis strombylosa*, spec. nov. Natural size.
a, *a*. Old female galls. *b*. Nearly fullgrown gall.
c. Section of old gall, showing peculiar form of cavity, and the tunnelling of Curculionid larvæ in the walls.

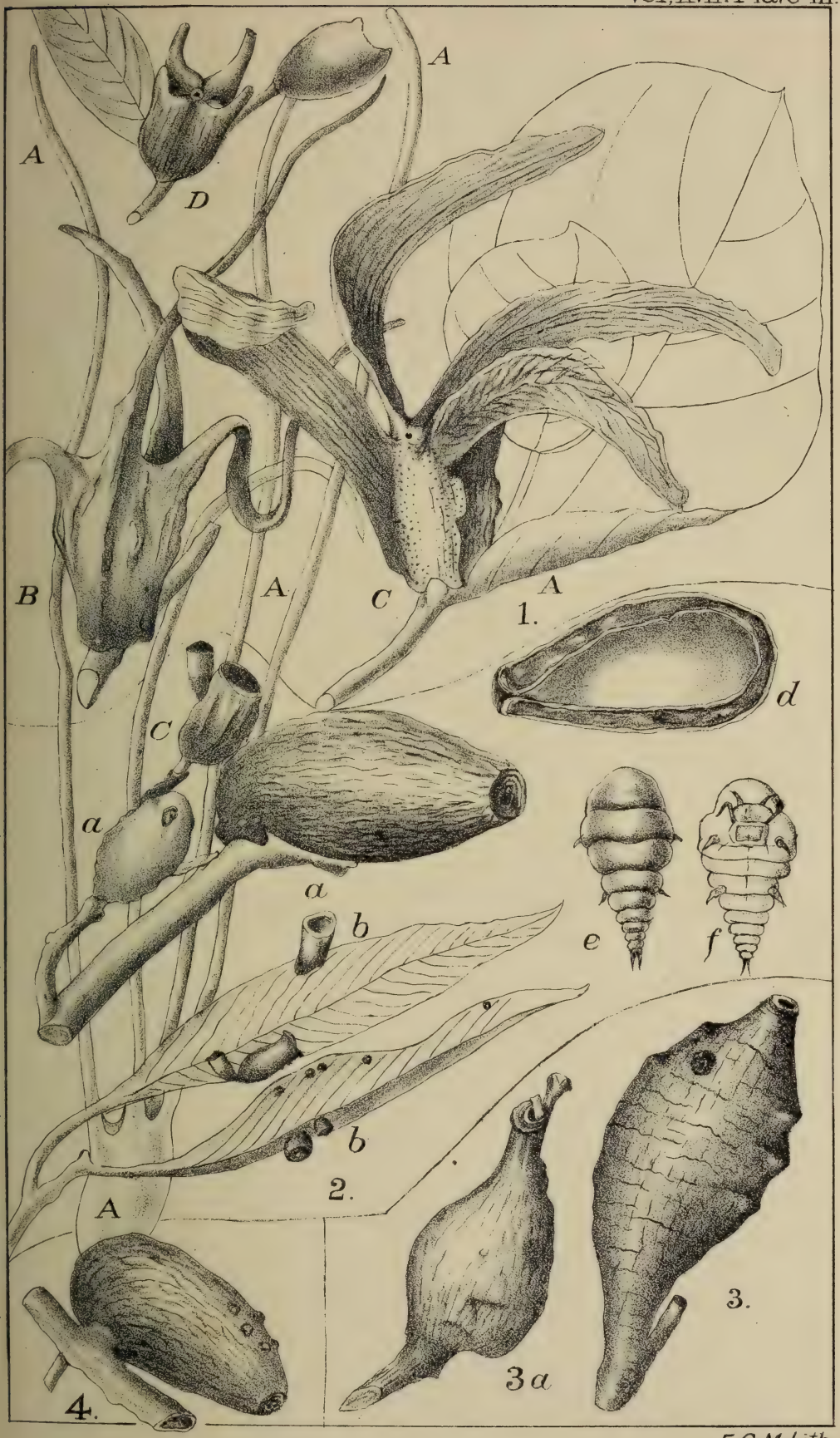
PLATE V.

Fig. 1. *Brachyscelis calycina*, spec. nov. Natural size.
a, *a*. Three mature galls, one stalked, two sessile, in various positions.
b. Three younger female galls.
c. Section of half-grown female gall, showing cavity and channel.
d, *d*. Male galls around young twigs.

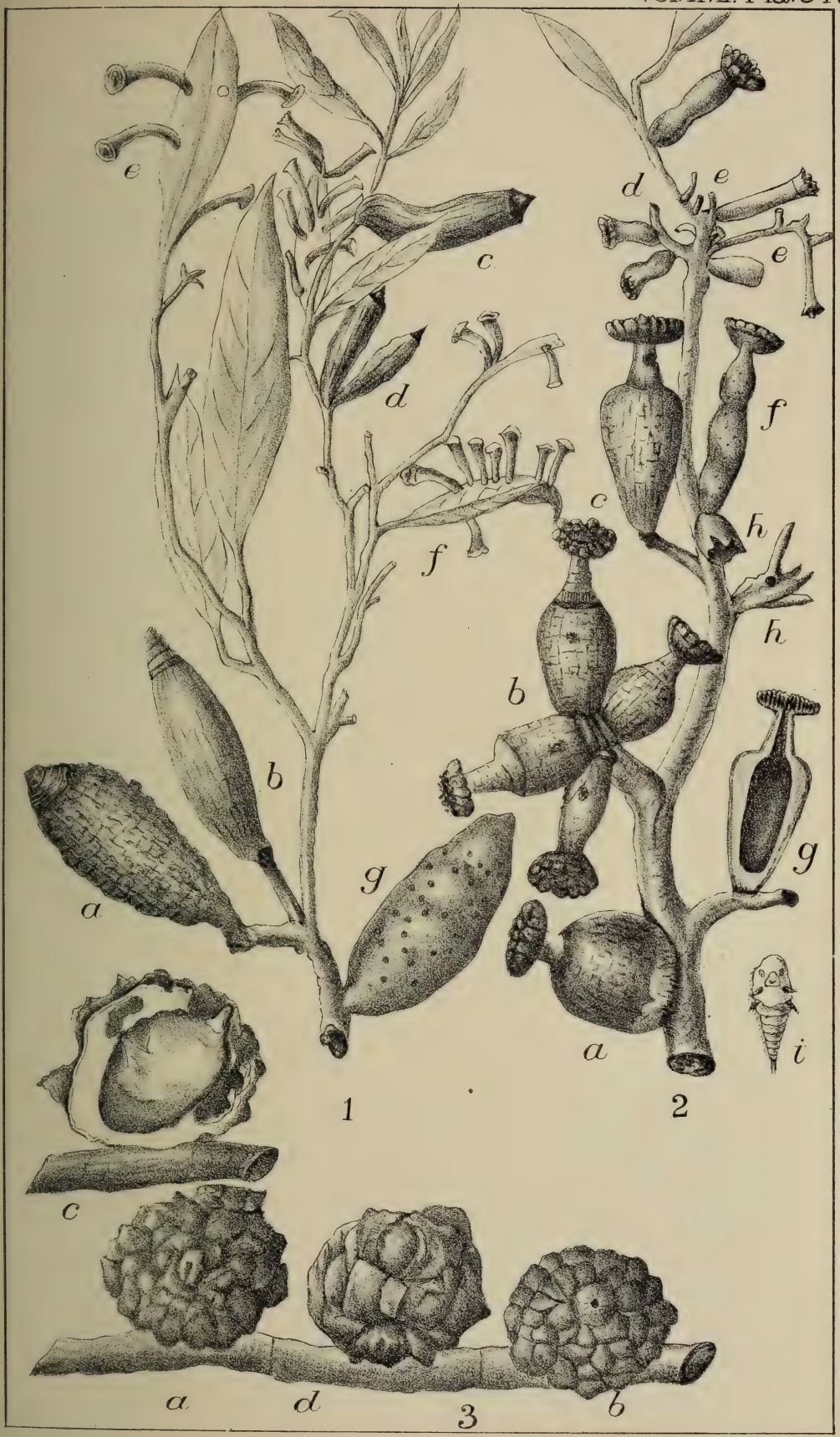
Fig. 2. *Brachyscelis Neumanni*, spec. nov. Natural size.
a. Normal form of female gall.
b. Abnormal form of female gall.
c. Male galls (?) interspersed among the females.
d. Section of female gall.

Fig 3. *Brachyscelis (?) Beyeriæ*, spec. nov. Natural size.
a, *e*. Female galls, in various stages of growth.
d. Section of small mature gall, showing the cavity, &c.

Fig. 4. *Ascelis (?) multitudinea*, spec. nov. Natural size.
a. Mature and young galls, as appearing when dried.
b. Female gall, after being soaked in water.
c. Section of same, showing cavity and channel.
d. Female insect, natural size and magnified.



E.C.M. Lith



E.C.M. Lith

E.C.M. Lith.

Notes and Remarks on South Australian Rhopalocera.

By J. G. O. Tepper, F.L.S.

[Read October 17, 1893.]

In part 1 of vol. XVII. of the Transactions of this Society a paper on the South Australian Rhopalocera is published by Mr. O. B. Lower, apparently intended to be a summary of what is known of the subject, frequent references being made to a previous paper published by me. As I cannot agree with many of his statements, I beg to record my views of the contested points in the order in which they occur in Mr. Lower's paper.

"It is usually considered, I believe, that the scarcity (?) of Rhopalocera in this colony is due to the great dryness during the season of flight. Also the severe droughts we are subjected to, &c. But my honest conviction is that the scarcity is due to the want of systematic collecting" (p. 1).

That the scarcity is *real* is shown by the fact that in the smaller area of Victoria 31 species of butterflies are recorded in the first part of the recently published "Victorian Butterflies," while of the corresponding families Mr. Lower only enumerates 13 species in South Australia. That this scarcity is due to physical causes is not only proved by the concurrence of all previous collectors (Messrs. Angas, Behr, Bathurst, Jung, Odewahn, Schulz, Waterhouse, Wilson Brothers, Mrs. Kraüsler, &c., beside me and my brother), but also by the corresponding scarcity of the moisture-loving ferns and mosses. The causes operate not only "during the season of flight," but chiefly upon the critical stages of larval and pupal life. Scarcity or abundance in the abstract is determined by the proportion of the number of species and individuals to a given area and time. It depends, partly upon the extremes of temperature (not the mean) which the insects or their food-plants are capable of resisting, partly upon absence or abundance of their enemies, where there are no formidable barriers of a physical nature to free intercourse between adjacent regions. The occasional capture of solitary specimens by zealous collectors only proves that the immigrants have not been able to effect a footing, or only a very temporary one. Such sporadic wanderers occur even in England and other old countries. Personal conviction is not evidence unless supported by many years of experience in the field, and

qualified by the requisite knowledge of biological, botanical, and physical science.

Delias Aganippe, *Don.*

I have seen many scores of this species in the early years of the colony, and should be able to distinguish the sexes and varieties. The figure in my "List" does not represent the female, as the comparison with any specimens will show.

Delias Harpalyce, *Don.*

The figure (4, plate iii., Trans. Roy. Soc., vol. IV.) of this *doubtfully* inserted species is badly reproduced (the right side best), and, from what I have since learned, cannot represent the above, or stand for the female of *D. Aganippe*, but more likely either for the following one or an hitherto unrecorded species or subspecies. The drawing was made in 1867 from specimens in my brother's collection before ever I thought of publishing anything, and is quite correct. Absent marks do not denote forgotten details, but absent characters in the specimens.

Delias Argenthona, *Fabr.*

This species was inserted in my list on the high authority of the late Mr. G. F. Angas, who figures the underside in "South Australia Illustrated," pl. xxxvii., fig. 2, from "the Lakes and the Coorong," and mentions that it and others had been identified by Mr. Doubleday. Surely Mr. Angas's statements are as reliable as anyone's. *Inter alia*, it may be remarked the figure on that plate differs considerably in marks and colour from my specimens of the real eastern *D. Argenthona*, and may not be this, but the kind, which from its upperside representation, I named "*Harpalyce*" (female).

Belenois Perimale, *Don. (?).*

A flight of these eastern butterflies occurred in November, 1889, and reached Adelaide, but were only about for a few days. Three specimens were secured, and are considerably abraded, as were all others seen flitting about. They resemble *B. Teutonia*, but the black and yellow of the underside is very much reduced, and the size is less. The original specimens of this species in the Museum are from the White collection and other sources, as hailing from Queensland. The specimens captured in Adelaide, &c., have to be regarded as sporadic wanderers, not as South Australian indigenes.

Callidryas Pyranthe, *Linn.*

This is undoubtedly another case of sporadic occurrence.

Danais Petilia, *Stöll.*

"Tepper calls this *D. Chrysippus*, Linn., in his list, a *widely different* species" (l.c., p. 4). Kirby and other systematists place this species close to the old world *Chrysippus*, the differences being really so slight that one is quite justified in considering them as racial varieties. George Semper says (Journ. Mus., Godefroy, part XIV., 1878):—"To establish the fact whether *Petilia* be rightly separated from *Chrysippus*, it is very desirable to know something of the first stages of the Australian form. It cannot be denied that specimens of *Chrysippus* from Morotai and Ceram approach *Petilia* very much in external appearance." Preceding the above-quoted (translated) sentence the same critical author calls them "very closely allied," the exact opposite to Mr. Lower's dictum. The species was not collected in South Australia previous to 1870, as far as I have been able to ascertain, its home being in Queensland and Northern Australia, probably owing to the absence of food-plants (Asclepiads), which subsequently became introduced as garden escapees, and should always be treated as an introduction, as well as the following.

Danais Erippus, *Cramer.*

This is a notoriously modern introduction since about 1875-1878. Kirby says that *Erippus* is a South American butterfly, while the variety *Archippus* was the most common North American form.

Xenica Achanta, *Don.*

I collected this species at Second (or Slape's) Gully in November, 1884. Subsequently I identified and exhibited specimens with others at a meeting of the Royal Society South Australia.

Pyrameis Itea, *Fabr.*

The *Stinging* Nettle (*Urtica urens*) cannot have been the original foodplant of this truly indigenous species, if it be such now, for this plant was intentionally (it is said) introduced by sheepfarmers as a fodder-plant for stock. The only native members of the Urticaceæ were the large semi-aquatic nettle of the Murray, &c., and the small common rockweed, *Parietaria debilis*. The fact that the species feeds now on the widely-spread introduced weed would account for its present abundance as compared with its scarcity inland during the earlier years.

Pyrameis Kershawi, *McCoy.*

Almost all lepidopterologists, it seems, are now agreed that this is really only a slightly diverging variety of the old *P. cardui*, which is also pointed out by Messrs. Anderson and Spry in their recently published work, "Victorian Butterflies," hence the name should be expunged.

"Dry cowdung" cannot be the proper shelter for its chrysalides for obvious reasons, but only an adaptation to circumstances where other means are absent. The species is undoubtedly indigenous, and has ever been one of the commonest. It invades even the streets of suburbs and city, owing to the safety afforded by the protective coloring of its underside.

JUNONIA VELLIDA, *Fabr.*

The spelling of "Junonisa," was copied by me from Masters' "Catalogue of Diurnal Lepidoptera" as the most recent publication at the time.

LUCIA LUCANUS, *Fabr.*

As regards the generic term, it is to be remarked that most of the genera of the *Lycaænidæ* are separated on such slight differences, that scarcely two authorities agree on the number. Hence *Cupido*, *Polyommatus*, *Lucanus*, &c., are sometimes treated separately, sometimes included in one or another or united under the old term *Lycæna* as it suits the predilection of the writer. In respect of this species Mr. Lower says, "this species has been confused with *Chrysophanus aurifer*, Blanch., a *very dissimilar* species." The qualifying terms are evidently exaggerating, as it is most unlikely that men like the late Hon. W. McLeay could confuse "very dissimilar" species, even at the most cursory glance. In Kirby's "Synonymic Catalogue of Diurnal Lepidoptera" they are placed close together, even bearing the same synonym *(Limbaria)*, hence they must be very like each other. My name, *Lycæna discifer*, was supplied by the late Hon. W. McLeay, no doubt, on account of its resemblance to that Queensland species.

The notoriously introduced Stinkwort *(Inula graveolens)* cannot be the food-plant of this indigenous species (as suggested) for obvious reasons, and the reference is therefore misleading. The mere "frequenting," *i.e.*, settling on or flying among or over the bushes, cannot amount to the deduction that such plant is the food-plant of the larvæ. The food of imagines being chiefly the nectar of flowers, they frequent all flowers provided with nectar as occasion demands, while many plants are simply used as resting places. Has anyone ever really met with insect larvæ feeding on the *Inula?* If so, the fact would be most interesting, and the insects should be fostered, bred, and protected as most valuable benefactors.

OGYRIS OTANES, *Felder* (1865).

OGYRIS IDMO, *Hewitson* (1850-52).

Comparing published figures and descriptions with specimens of either, I have little doubt that both are either identical or

only slight varieties of the same species. Kirby's inclusion of Hewitson's *O. Otrontas* with *O. Idmo* is either a misprint or mistake, and intended, it seems to me, for *O. Otanes*, as *O. Otrontas* is without the large pale spot in the forewings of the female, which is so conspicuous and characteristic a mark in both the others. For the same reasons the latter have no connection with my *O. halmaturia*, and Mr. Lower's distribution of the sexes is entirely fanciful. I have observed *O. Otanes* (identified by the Hon. W. McLeay) at Nuriootpa numerously for several seasons from 1873 to 1889, and of *O. Idmo*, Hew., is a pair in the Museum (presented by the late Mr. McDougall) from Southern Yorke's Peninsula. Having seen the sexes repeatedly *in coitu* at the former locality, I should think myself capable of distinguishing them. But at Nuriootpa I have never observed any females without the pale spot, or at Kangaroo Island any spotted ones, although for several days keenly on the hunt; but often had the opportunity of seeing the males attend or chase the unspotted females in the neighbourhood of Queenscliffe. The Kangaroo Island species, my *O. halmaturia*, differs also from *Idmo-Otanes* in coarser and more distant scales, besides form and colour.

Unless, therefore, *O. halmaturia* be identical with *O. Otrontas*, Hew., which I still doubt, not having seen specimens of the latter, I regard it as a good species on account of accurate observations in the field. The Port Lincoln specimens belong most likely also to *O. halmaturia*.

Ogyris Oraetes, *Hew.*

Ogyris Amaryllis, *Hew.*

From a careful study in the field, and a comparison of figures and descriptions, it appears to me that both these names refer to the same species. I had the opportunity for observing these butterflies on several occasions at Coromby, Victoria, where they were rather numerous, and frequenting all sorts of cultivated plants and flowers in the bright sunshine, both sexes being intermixed (*i.e*, both "species"), and attending each other promiscuously. On the other hand I received the same forms from Southern Yorke's Peninsula, caught in the same locality, and by the same person. The female "*Amaryllis*" is distinguished by red bars on the underside of the forewings from all other species, and is so figured by Hewitson and Angas. The male "*Oraetes*," figured by Hewitson, is always found attending the former, hence the conclusion that both are the sexes of one species. The difference of the colouring of the upper side of the females is due to abrasion or its absence, and then more or less hyaline or opaque. The female being the more characteristically marked,

its name should take precedence, and "*O. Oraetes*" be relegated to the synonyms.

It is probable that *O. Amaryllis*, a native of South-Eastern Australia, only obtains a sporadic footing during favorable seasons so far west as Southern Yorke's Peninsula.

Ogyris Olane, *Hew.*

In "South Australia Illustrated" (plate xxxvii.) the underside of an undetermined species is figured, which is probably this species. The habit of the ants in connection with this species, as mentioned in Mr. Lower's paper, is peculiar, but I doubt whether these insects are in need of a brush for "cleaning" themselves, nature having provided them with efficient means for that purpose. The experiments recorded for testing whether a sweet secretion be the attraction are wholly inconclusive, such secretions being only discharged while feeding in health and liberty, and then usually at intervals and sparingly. More probable it is that the ants are enlisted as protectors by some peculiar faint odour agreeable to them, or resembling that by means of which they appear to distinguish their favourites and housemates, according to Sir John Lubbock and others.

Descriptions of New Australian Heterocera.

By Oswald B. Lower, F.E.S.

[Read October 17, 1893.]

MONOCTENIADÆ.

Epidesmia brachygrammella, *n. sp.*

Male, 40 mm. Head, thorax, legs, abdomen and palpi pale ochreous-fuscous; palpi four times the width of eye, beneath fuscous; pectinations of antennæ five. Forewings triangular, costa arched at base, thence almost straight, apex slightly produced; hindmargin slightly sinuate beneath apex, thence bowed oblique; light greyish-ochreous, costal edge somewhat yellowish throughout; a thick black nearly straight streak from inner-margin at one-third to middle of disc with a tooth or angulation posteriorly; a similar black streak from two-thirds of inner-margin to three-fourths across wing, curved inwards on lower half, and outwards on upper half, with indications of an anterior tooth, almost reaching tooth of previous streak; a black discal dot midway between these above middle; a row of black, paler edged dots from costa near apex to anal angle, between dots and last mentioned streak the ground-colour is clearer ochreous; a hindmarginal row of small black dots; cilia greyish-ochreous. Hindwings with hindmargin nearly straight, apex somewhat prominent; colour as in forewings, somewhat infuscated; a large suffused blackish discal dot in middle of wing; a faint suffused fuscous line beyond this cilia as in forewings.

One specimen from Mr. W. H. F. Hill, of Windsor, Victoria, taken at Croydon, Victoria. Nearest *E. hypenaria*, Gn., but distinct by the two black lines, which, however, do not quite reach the inner-margin, although indicated.

Epidesmia phædropa, *n. sp.*

Male, 32 mm. Head and thorax reddish-fuscous, face and palpi black, palpi three times the width of eye. Antennæ fuscous, basal fourth white, pectinations five. Abdomen and legs whitish, fuscous-tinged. Forewings triangular. Costa nearly straight. Apex rounded, hindmargin bowed, oblique; pale-reddish fuscous, sprinkled with blackish. Costal edge whitish throughout, beneath this a streak of reddish from base to about middle and beneath this a streak of dark-fuscous from base

to beyond middle and suffusedly continued to apex; a dark fuscous dot above inner-margin at two-fifths, another above in middle of disc, and a third beyond middle of disc; a dark fuscous streak from three-fourths of inner-margin to costa near apex, preceded by a paler shade, between this line and hindmargin the ground colour is more purplish; a row of fuscous dots from near apex to anal angle; a hindmarginal row of black dots; cilia whitish, somewhat reddish tinged, tips fuscous tinged. Hindwings with hindmargin nearly straight; dull purplish-white; a black discal dot above middle; a fuscous streak from beyond middle of inner-margin to half-across wing, anteriorly edged with paler; an indistinct subterminal line, edged with paler; hindmarginal dots and cilia as in forewings.

One specimen from Mackay, Queensland, sent by Mr. Rowland Turner. Allied to *oxydercis*, Mey., but differs by the three anterior discal dots, &c.

ONYCHODES HELIOCHRYSA, *n. sp.*

Female, 60 mm. Head, thorax, palpi, and antennæ dark-fawn, antennal pectinations one and a half. Abdomen and legs whitish ochreous. Forewings triangular, posteriorly dilated, costa nearly straight, apex slightly produced, hindmargin slightly sinuate beneath apex, hardly waved, bowed, oblique; dark-fawn colour, with indications of pale ferruginous patches; a purplish dot at base of wing; cilia dark ferruginous, indistinctly tinged with coppery. Hindwings with hindmargin slightly waved, rounded; bright orange; a dark fuscous hindmarginal band, narrowed towards anal angle and ending on vein 6; cilia ochreous grey, infuscated. Forewings beneath with the discal area orange; a large purplish fuscous transverse patch at end of cell Hindwings greyish, slightly ochreous tinged towards inner-margin.

A handsome species. One specimen from Woodend, Victoria. (*Coll., Kershaw.*)

GEOMETRIDÆ.

EUCHLORIS CHIONOPLACA, *n. sp.*

Male 34 mm. Head and thorax deep green. Abdomen deep green, apex and underside white, above with a series of three small white dorsal spots, and one much larger, suffused anteriorly with ferruginous; a white dot on middle of collar; postorbital rims white. Palpi green above, white below, terminal joint yellowish, apex of second joint white. Antennæ fuscous, pectinations four; terminal two-fifths filiform; middle and posterior legs snow-white, latter with pencil of long white hairs; anterior pair pale-brownish, with whitish tarsal rings. Forewings triangular, costa gently arched, apex rounded, hindmargin crenulate-rounded, oblique; deep grass-green, thinly scaled, and minutely

flecked with white on veins, veins outlined with darker green. Costa dark fuscous, strigulated with white, beneath which is a streak of darker green throughout; a large white spot before middle of hindmargin, followed by a transverse row of small white spots; hindmarginal line darker green, with white spots at extremities of veins; cilia green, terminal half whitish. Hindwings with hindmargin rounded, crenulate, slightly bent on vein 4; colour, hindmarginal dots and cilia as in forewings; a large white patch resting on vein 3 near hindmargin, in shape somewhat like a Maltese cross.

One specimen, Mackay, Queensland, received from Mr. Rowland Turner. Near *speciosa*, Lucas; perhaps it is the male of that species although very different, and I hardly think it possible to be the same.

SELIDOSEMIDÆ.

Selidosema zygophora, *n. sp.*

Male 38, female 42 mm. Head, legs, and antennæ ochreous-whitish. Antennæ spotted with darker; pectinations eight. Face and thorax pale ochreous fuscous. Abdomen ochreous-whitish. Forewings triangular, costa gently arched, hindmargin obliquely rounded; pale-brownish ochreous; a somewhat curved dark fuscous line from one-sixth costa to one-fourth inner-margin, but hardly reaching it, followed by a similar parallel; a short dark fuscous dash on costa before middle, suffusedly continued to inner-margin, indicating median shade; a well (darker at extaemities) blackish line from just beyond middle of costa to very near anal angle, with a strong, almost acute, angulation above middle, containing an elongate blackish transverse discal dot, which rests on lower extremity; this line is followed by a similar parallel line; a strongly dentate double-fuscous line from five-sixths costa to anal angle, leaving a narrow interspace of pale ochreous; the ground-colour between the angulated line and these lines is somewhat paler; a hindmarginal row of small black dots; cilia pale fuscous, Hindwings with hindmargin rounded; pale yellow; a small fuscous median discal dot; a suffused pale fuscous double hindmarginal line, indicating submarginal and subterminal; cilia pale yellowish-white.

Two specimens from Croydon, Victoria, taken by Mr. W. H. F. Hill, to whom I am indebted for a specimen. This species has a rather abnormal appearance, being somewhat like a *Pseudoterpna*.

Thalaina hieroglyphica, *n. sp.*

Male, — mm. Head and thorax white, slightly tinged with ochreous. Forewings with apex somewhat prominent, hindmargin

bowed, slightly waved, silvery-white ; markings light brownish, edged with dark fuscous ; a streak along basal-fourth of costa ; a streak along inner-margin from near base to anal angle ; a similar streak along submedian fold from before middle, confluent posteriorly with this and first fascia ; a narrow, nearly straight, but somewhat irregular fascia from near costa at about two-fifths to anal angle ; an irregular streak running from this fascia above middle to middle of hindmargin, somewhat interrupted before junction with second fascia ; a discal spot above anterior extremity of this ; second fascia obtusely angulated inwards near costa, running from costa at five-sixths to meet longitudinal median streak before hindmargin ; an oblique triangular-like apical mark, two oval spots on hindmargin above middle, upper confluent with apicel mark, and two others below middle ; cilia white, partially spotted with brown. Hindwings with hindmargin rounded, somewhat waved ; white ; a moderate suboval or irregular blackish-grey subapical spot. Underside of wings white, with a black subapical blotch.

One imperfect specimen bred in April, larvæ found feeding on *Acacia pycnantha*, at Blackwood, South Australia.

This species is superficially very like *inscripta*, Walk., but differs in having the discal dot, a character not shared by any other known *Thalainæ*. The larva is totally different, as will be noted below. Larva of *T. hieroglyphica*—full fed, 36 mm. elongate, tapering at both ends. Head shining black, with an ochreous white blaze on each side of posterior portion, and with a few erect black hairs, face pale ochreous white. Body light-purplish black, with numerous longitudinal waved whitish ochreous fine lines, the three centre ones being thicker and more conspicuous. When in motion the larva shows two scarlet spots on the anterior portion of each segment ; when at rest they are scarcely noticeable. On the twelfth segment are two raised scarlet warty protuberances. Anal segment and claspers whitish, minutely irrorated with black ; claspers rather broadly lamelliform. A broad yellow longitudinal lateral stripe along whole length of body, edged on both sides with intense black. Spiracles black, placed on the yellow stripe, prolegs dull crimson. Belly pale emerald-green suffusedly edged with dull crimson. All segments clothed with very sparse (about twelve at most) stiff black hairs ; full-fed October. Larva of *T. inscripta*—Full grown ; length, 26 mm. Head green, with a few minute blackish scales. Body cylindrical, smooth ; yellowish green ; second segment with two bright orange-red spots, small, one on each side of dorsum placed on anterior part of segment ; a darker green, yellowish edged, moderate, continuous band throughout entire dorsal portion of body (anal segment excepted), sparsely dusted

with blackish; on each side of this band, and parallel to it, are two pale yellowish waved lines. A very prominent ridge-like pale yellow lateral line, edged somewhat with dark fuscous, starting from one of the orange spots on second segment, and continued uninterruptedly round body and anal segment, and returning to orange spot on opposite side. Claspers pale-green. Spiracles blackish; prolegs whitish-yellow. Abdomen beneath pale-green with three white waved lines, one in middle and one on either side, the two latter continued the whole length of body, middle line starting from posterior pair of prolegs and ending on anterior pair of true legs.

Feeds on *Acacia decurrens*, full-fed end of September, imago emerges during April.

Mnesampela (?) dictyodes, *n. sp.*

Female, 50 mm. Head, legs, palpi, and thorax blackish, with a purplish tinge; thoracic crest large, well-developed, anteriorly tinged with light reddish-purple. Thorax very woolly beneath. Palpi very long and rough, somewhat dilated towards apex. Antennæ reddish-fuscous. Abdomen greyish. Forewings elongate-triangular. Costa strongly arched towards base, sinuate beyond middle; apex very prominent, acute. Hindmargin strongly bowed and dentate, more prominent on veins 4 and 5; dark purplish-fuscous, irrorated finely with blackish strigulæ, which becomes so dense on basal third as to form an almost black patch, which extends rather more or less along costa to apex and hindmargin. Cilia dark coppery-fuscous. Hindwings with hindmargin strongly dentate, light fuscous-purplish, basal half whitish; separation well defined. Cilia fuscous, paler at base. Wings beneath light dull-purplish, with a large, black, apical patch on all wings, that on hindwings more pronounced.

One specimen, bred by Mr. G. Lyell, jun., Gisborne, Victoria.

This is a curious and striking insect, and will possibly require a new genus when the male is known. In general appearance it reminds one of *Stathmorrhopa beggaria*, Gn. The form of wing and palpi are noticeable characters.

Stibaroma plagiosema, *n. sp.*

Male, 40 mm.; female, 48 mm. Head, palpi, thorax, legs, and abdomen ashy grey-whitish. Thorax with two narrow, transverse, black bands, meeting in middle. Abdomen with black rings, edged with white. Antennæ fuscous, pectinations four. Forewings elongate triangular. Costa gently arched, more so in female; hindmargin hardly waved, rounded, oblique; ashy-grey-whitish, densely strewn with dark-fuscous scales, in the male with some obscure fuscous-reddish patches; markings black; a narrow

outwards curved line close to base ; a second, curved from one-fifth costa to about one-third inner-margin ; a third, more obscure, from before middle of costa to middle of inner-margin, dentate inwards on lower half ; a fourth from before three-fourth of costa to beyond two-thirds of inner-margin, bent inwards on lower half ; an elongate spot in disc above middle, between third and fourth lines, near fourth ; a fine waved blackish hindmarginal line ; cilia white, with black points at extremities of veins. Hindwings with hindmargin irregularly waved, rounded ; whitish in male, darker in female ; a black discal dot ; a fine waved line, blackish, from three-fourths costa to near anal angle ; a suffused blackish hindmarginal band darker anteriorly ; hindmarginal line and cilia as in forewings. Markings of hindwings more strongly defined on underside. The present is intermediate between *melanotoxa*, Meyr., and *trigramma*, Lower, but nearer the latter. This and the two above-mentioned form a closely-connected group.

Gisborne, Victoria.

XYLORYCTIDÆ.

Plectophila placocosma, *n. sp.*

Female, 14 mm. Head and thorax snow-white, palpi and antennæ dark fuscous, terminal joint of palpi and an apical ring of second joint white ; basal joint of antennæ whitish. Abdomen and legs yellow, anterior and middle tibia mixed with fuscous. Forewings moderate ; costa gently arched, apex obtuse, hindmargin obliquely rounded ; white, slightly ochreous tinged ; a broad dark fuscous fascia suffused on lower half, anterior edge curved from one-sixth costa to one-sixth inner-margin ; a large irregular fuscous patch on costa beyond middle, reaching more than half across wing, anterior edge preceded by a blackish discal spot ; a large fuscous patch on hindmargin from apex to anal angle ; a fuscous hindmarginal line, separated from preceding patch by a streak of ground-colour ; cilia yellowish, with a fuscous apical spot. Hindwings yellowish, with a broad fuscous suffusion occupying posterior two-thirds of wing ; cilia yellowish, with a blackish line, double at apex.

Sydney, New South Wales. One specimen from Mr. W. W. Froggatt.

ŒCOPHORIDÆ.

Philobota pentamera, *n. sp.*

Female, 22 mm. Head dark fuscous, palpi and thorax white, thorax with a narrow fuscous anterior band, terminal joint of palpi externally fuscous. Legs and abdomen ochreous-yellow, anterior legs infuscated. Forewings moderate, costa arched,

more strongly at base, apex obtuse, hindmargin rounded oblique; a broad dark fuscous fascia almost from middle of costa to middle of inner-margin, anterior edge with a short projecting tooth in middle, posterior edge somewhat suffused; the ground-colour between fascia and base is white, faintly ochreous tinged, except a short fuscous streak on costa at base; the colour beyond the posterior edge of fascia is bright yellow, except a broad dark-fuscous hindmarginal band, which contains an ill-defined yellow spot in its lowest extremity; the median third of this band projects so as to nearly touch the median fascia; cilia bright yellow, at anal angle dark fuscous. Hindwings with the hindmargin rounded; yellow; a fuscous hindmarginal band, broadest at apex, and not reaching anal angle; cilia yellow, infuscated towards median third.

One specimen from Gisborne, Victoria, received from Mr. G. Lyell, jun. This species is in the neighbourhood of *ophiodes*, Meyr., and *sigmophora*, Meyr., but nearer the latter.

Casyra Kershawi, *n. sp.*

Male and female, 16 and 17 mm. Head and palpi yellow; thorax and abdomen purplish-fuscous. Legs and antennæ dark fuscous, antennæ annulated with ochreous, posterior legs ochreous tinged. Forewings moderate, costa gently arched, apex obtuse, hindmargin rounded oblique; bright-ochreous yellow; a narrow fuscous purple basal fascia; a hindmarginal band of purple-fuscous, occupying apical two-fifths of wing, darker on margins, and containing a roundish spot of ground-colour on costa; cilia purplish-fuscous, with a darker median line, tips paler. Hindwings with hindmargin rounded; dark bronzy-fuscous; cilia bronzy-fuscous.

Four specimens, Springvale, Victoria, received from Mr. J. A. Kershaw, to whom the species is dedicated. It is nearest *dichroella*, Zeller, but narrower winged, and separable by the spot of ground-colour in band.

NOTE.

Euproctis pelodes, Trans. Roy. Soc., S.A., p. 150, vol. XVII, 1893. The size is 25 mm.

Sterrha aglaodesma, p. 157, l.c. The size should be 21 mm

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 17, 1893.]

XIV.

CARABIDÆ.

XANTHOPHŒA.

X. satelles, sp. nov. Elongata; nitida; brunneo-testacea, antennis palpis pedibusque dilutioribus, elytris et prothorace (ut *X. infuscatæ*, Chaud.) piceo-vittatis; prothorace quam latiori fere longiori, lateribus antice minus fortiter rotundatis postice fortiter sinuatis, angulis posticis acutis sat fortiter extrorsum directis; elytris punctulato-striatis, interstitiis sparsim subtiliter punctulatis, 3° puncturis setiferis 4 instructo. Long., 4 l.; lat., $1\frac{1}{5}$ l.

Resembles *X. infuscata*, Chaud., and *X. angustula*, Chaud., but differs from them both in having no setiferous punctures on the fifth interstice of the elytra. Differs from *infuscata* also by its narrower and more elongate form (the prothorax by measurement scarcely so wide as long); and from *angustula* by the hind angles of its prothorax more strongly directed outward.

S. Australia; Eyre's Peninsula.

X. filiformis, sp. nov. Elongata; angustissima; nitida; testacea, sutura plus minusve infuscata, capite prothorace antennisque rufescentibus; prothorace leviter transverso, lateribus antice modice rotundatis postice sinuatis, angulis posticis acutis parvis extrorsum minus evidenter directis; elytris punctulato-striatis, interstitiis sparsim subtilissime punctulatis, 3° puncturis setiferis 3 instructo. Long., $3\frac{1}{2}$ l.; lat., 1 l.

Even narrower and more elongate than the preceding. Coloured quite differently from *infuscata*, *angustula*, and *satelles*, and differing from them also *inter alia* by the much finer puncturation of its elytral interstices, and from the former two by the absence of setiferous punctures on the fifth interstice. The three punctures on the third interstice will distinguish it from *lissodera*, Chaud., *parallela*, Chaud., and *ferruginea*, Chaud.

S. Australia; Goat Island, off Goolwa.

SILPHOMORPHA.

S. rufoguttata, sp. nov. Nitida ; atra, macula in utroque elytro magna antemediana pedibus abdomineque rufis ; corpore supra sat subtiliter nec crebre punctulato ; elytris prope marginem lateralem longitudinaliter sulcatis. Long., $2\frac{2}{5}$ l. ; lat., $1\frac{1}{5}$ l.

The upper surface in colour and markings resembles *P. biplagiata*, Cast., but the spots on the elytra are nearer the base. The species is much more nitid, and very much smaller than *biplagiata*. It should stand, I think, nearer *Castelnaui*, Reiche., compared with which the reflexed margin of the prothorax is wider, the surface is (not impunctate, but) quite distinctly punctulate, the elytra are sulcate near the lateral margin, and the markings are quite different.

N. Queensland ; taken by Mr. Cowell.

PHALACRIDÆ.

LITHOCRUS.

L. consors, sp. nov. Sat breviter ovalis, postice sat angustatus ; nitidus ; testaceus, supra capite prothorace et elytrorum maculis (altera magna trifida basali, altera cordiformi communi postmediana) nigris ; capite prothoraceque vix perspicue punctulatis ; elytris (stria suturali postice excepta) haud striatis vix perspicue seriatim punctulatis. Long., $\frac{4}{5}$ l. ; lat., $\frac{1}{2}$ l.

Resembles *L. læticulus*, Blackb., but differs from it by smaller size, elytra without a trace of striæ except the sutural stria on the hinder part of each elytron, and somewhat different markings of elytra ; which consist of (1) a blotch covering the base and sending out a broad triangular median extension with its apex on the suture a little in front of the middle, and also a narrower branch (brownish rather than black) running hindward along the lateral margin of each elytron ; (2) a small common cordiform spot a little behind the middle.

N. Queensland ; taken by Mr. Cowell near Cairns.

BUPRESTIDÆ.

STIGMODERA.

S. terræ-reginæ, sp. nov. Fem. Sat depressa, minus elongata, fere glabra (corpore subtus sparsim breviter pilosa); corpore subtus (prosterni lateribus rufis exceptis) capite antennis scutello pedibusque læte viridibus ; prothorace nigro-cyaneo, margine antico viridi, lateribus late rufis ; elytris rufis, basi suturaque (anguste), parte apicali quinta, macula magna communi a basi ultra medium producta, et macula subro-

tundata postmediana marginem lateralem nec suturam attingenti, nigro-cyaneis ; capite longitudinaliter sulcato, inæqualiter punctulato, clypeo antice emarginato ; prothorace quam longiori (et postice quam antice) vix duplo latiori, longitudinaliter (fere ut *S. gibbicollis*, Saund.) convexo, fortiter (in medio minus, ad latera magis, crebre) punctulato, lateribus sat fortiter rotundatis, latitudine majori pone medium posita ; elytris punctulato-striatis, basi sat fortiter (fere ut *S. gibbicollis*, Saund.) antrorsum productis, apice singulatim oblique emarginatis 2-spinosisque, lateribus postice sat fortiter denticulatis, interstitiis (apice summo excepto) vix convexis crebre vix subtiliter (fere ut *S. flavæ*, Saund., sed paulo minus subtiliter) punctulatis ; corpore subtus subtilius minus crebre (prosterno medio magis fortiter) punctulato. Long., 7 l.; lat., 3 l.

The prothorax resembles that of *S. gibbicollis*, Saund., in build ; the elytra having the somewhat depressed form (incurved behind the shoulders, and at their widest behind the middle) of *S. undulata*, Don. The close comparatively strong puncturation of the elytral interstices is a conspicuous character. The markings are not much like those of any other described *Stigmodera ;* regarding the red colour as the ground of the upper surface, the bluish-black marks are a long oval discal patch commencing on the front margin of the prothorax, and continued backward to behind the middle of the elytra, a large roundish spot on each elytron behind the middle (touching the lateral margin, but not the suture), the apical one-fifth of the elytra and the suture between the discal patch and the dark apex.

N. Queensland ; in the collection of C. French, Esq.

ELATERIDÆ.

HETERODERES.

H. cairnsensis, sp. nov. Sat elongatus ; minus depressus ; fusconiger, pube brevi pallide fulva vestitus (pube ad prothoracis basin magnam plagam triangularem denudatam simulanti), oris membris antennarum basi prothorace versus angulos posticos pedibusque pallide testaceis ; antennis (maris ?) prothoracis basin vix superantibus, articulo basali quam 2us 3us que conjuncti parum breviori, hoc quam ille sat longiori quam 4us sat breviori ; capite haud carinato ; prothorace quam trans angulos posticos latiori vix longiori, dupliciter punctulato ; in medio longitudinaliter concavo, angulis posticis carinis singulis (his sat elongatis a margine laterali modice divergentibus) instructis ; elytris punctulato-striatis, ad apicem rotundatis, interstitiis sat planis. Long., $3\frac{1}{2}$ l. ; lat., 1 l.

This species is remarkable by the curious appearance (apparently constant) of the pubescence on the prothorax, which to a casual glance seems to be wanting in such fashion as to leave a large denuded triangle with its base on the base of the elytra and its apex a little behind the middle of the disc ; but on careful examination this seems to be due to the median sulcus in combination with the posterior declivity causing the light to fall unequally on the surface. The insect differs from *H. carinatus*, Blackb., *inter alia* by its non-carinate head, and from *albidus*, Macl., by the prothoracic character mentioned above, and by the third joint of the antennæ being considerably shorter than the fourth.

N. Queensland ; taken near Cairns by Mr. Cowell.

TENEBRIONIDÆ.

PLATYDEMA.

P. victoriense, sp. nov. Ovale ; subtus piceo-ferrugineum, supra variegatum, capite prothorace (hoc ad latera plus minusve rufo) antennisque (articulis basalibus 3 vel 4 rufis) piceis, elytris læte rufis macula magna communi rotundata in medio disci posita ornatis, pedibus plus minusve rufescentibus ; antennis sat brevibus sat crassis (magis brevibus magis crassis quam *P. tetraspilotæ*, Hope) ; capite sat crebre subrugulose, prothorace minus crebre haud rugulose (quam *P. tetraspilotæ*, Hope, manifeste minus crebre) punctulato ; hujus figura fere ut *P. tetraspilotæ :* elytris fortiter punctulato-striatis, interstitiis sat convexis sat sparsim punctulatis. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

Slightly longer and wider than *P. tetraspilota*, Hope, which it resembles much in colouring, but the blackish colour on the elytra (instead of forming a fascia reaching the lateral margin on either side) forms a large common roundish oval spot separated from the lateral margin on either side by three or four interstices. Compared with *P. tetraspilota*, the present species has shorter and thicker antennæ, prothorax considerably less closely and evidently more strongly punctured, elytral interstices more convex and more strongly and less closely punctured. The head is devoid of a horn in all the examples before me, one of which I believe to be a male.

Victoria.

CURCULIONIDÆ.

(OTIORHYNCHINI.)

APIROCALUS.

A. cornutus, Pasc. Among some *Curculionidæ* taken by Mr. Froggatt, and sent to me for identification, I find two specmens

ticketed "N.-W. Australia," which I am unable to distinguish from examples of *A. cornutus* that I have received from New Guinea. The genus is remarkable among its near allies for its anterior coxæ not being contiguous, as well as for the very peculiar shape of its elytra, and has not previously been reported as Australian

LEPTOPSINI.

CHERRUS.

C. ocularis, sp. nov. Mas. Modice elongatus; piceus, indumento fusco dense tectus, oculis squamis niveis circumcinctis, pedibus et corpore subtus (præsertim maculis in abdomine nonnullis) hic illic squamis setulisque griseis vel albidis variegatis; rostri sculptura ut *C. ruficornis*, sed sub indumentum vix manifesta; antennis minus gracilibus, funiculi articulo basali quam 2us 3us que conjuncti paullo breviori; prothorace quam elytra fere latiori, quam longiori fere dimidia parte (postice quam antice circiter quarta parte) latiori, supra sat planato tuberculis sat elevatis sat inæqualibus plus minus crebre ornato, lateribus sat fortiter ampliato-rotundatis, lobis ocularibus fortiter productis; elytris quam prothorax vix duplo longioribus, ad basin quam prothoracis basis haud latioribus, mox pone basin constrictis, hinc ad apicem ovalibus, minus convexis ad latera abrupte verticalibus, parte dorsali haud manifeste striata plus minusve distincte seriatim punctulata et tuberculis nonnullis sat magnis seriebus binis dispositis (granulis nonnullis minus ordinatis intermixtis) ornata, parte verticali punctulato-striata (interstitiis convexis), humeris sat acute productis.

Femina latet. Long., 7 l.; lat., $2\frac{4}{5}$ l.

Very distinct from its previously described congeners by the snowy-white scales round the eyes, which seem to be constant, as well as by the conspicuous spots of whitish scales on the abdomen. As in the other tuberculate *Cherri* (so far as I have observed them) the tubercules on the prothorax and elytra are alike in but few specimens. Those on the prothorax are distinctly isolated *inter se*, not confluent or vermiculate (as they are in *plebeius*, &c.), and are generally arranged in clusters, leaving large free spaces, but in some examples are more evenly distributed. On each elytron in most individuals there are two rows of large isolated tubercles (about where the third and fifth interstices might be), varying in number from three or four to about eight; and there are also a number of well-defined isolated granules, sometimes running in rows, sometimes much confused. The tubercles vary much in size. To the eye the prothorax appears wider than the elytra. I have taken the "length of the

elytra" to be the same as the "length of the underside from the front of the intermediate coxæ hindward." The fuscous indumentum covers the whole upper surface in all the examples I have seen. I have removed it with some difficulty from one example, and find that the derm is very nitid with rows of large punctures on the elytra.

Victoria.

C. ruficornis, sp. nov. Mas. Sat elongatus; piceus, indumento squamoso pulverulento silaceo vestitus, antennis (clava excepta) læte rufo-testaceis; rostro sat nitido crebre sat subtiliter punctulato, quam caput paullo longiori nec angustiori, supra profunde canaliculato (canali in frontem continuato, in fundo carina antice triangulariter dilatata instructo), prope basin utrinque sulco oculum fere attingenti impresso; capite prothoraceque subtillissime confertim punctulatis et puncturis majoribus nonnullis impressis; hoc sulcis brevibus foveisque sparsim confuse notato (his in exemplis nonnullis magis profundis et crebrius dispositis sic ut prothorax plus minusve tuberculatus videtur); antennis sat elongatis, funiculi articulo basali quam 2us 3us que conjuncti vix breviori; prothorace quam elytra sat latiori (exemplorum nonnullorum vix latiori), quam longiori plus quam tertia parte latiori, antice fortiter angustato, lateribus fortiter ampliato-rotundatis, lobis ocularibus fortiter productis; elytris quam prothorax vix duplo longioribus, ad basin quam prothoracis basis haud latioribus, pone basin plus minusve constrictis, hinc ad apicem elongato-ovalibus, ad latera abrupte verticalibus, parte dorsali geminatim punctulato-striata (interstitiis inter parium strias haud vel leviter convexis, inter paria fortiter costatis), parte verticali punctulato-striata (interstitiis minus convexis); pedibus anticis fortiter elongatis. Long., $6\frac{1}{2}$ l.; lat., $2\frac{4}{5}$ l.

Femina. Multo magis robusta, elytris quam prothorax sat latioribus; fortiter convexa; sculptura tota magis crassa, pedibus anticis sat brevibus. Long., 7 l.; lat., $3\frac{4}{5}$ l.

Like most of its congeners, this species is so variable that it is difficult to find two specimens identical *inter se* in respect of sculpture, &c. In some examples the sulci on the prothorax are few and lightly impressed, while in others they are so deep and numerous that the surface appears profoundly vermiculate-rugulose; in some the interstices separating the two striæ of each pair on the elytra are quite flat, while in others they are more or less convex; in some the elytral costæ are quite smooth, while in others they are more or less uneven; in some males the prothorax is scarcely wider than the elytra, while in others it is

considerably wider. The species may, however, be known from all its described congeners by its bright testaceous-red antennæ.

S. Australia.

ERIRHININI.

This tribe of *Curculionidæ* is represented in Australia by a very great number of genera and species. Its metropolis appears to be the southern and western portions of the continent; very few species have been found in the North and North-East. The Australian *Erirhinini* present extreme difficulty in classification on account of the existence of species in which the distinctive characters of the tribe gradually disappear, so that it is impossible to characterise the tribe in terms that will distinguish it sharply from all the allied tribes. Thus, Mr. Pascoe described several genera as *Erirhinini*, in which the pectoral canal of the *Cryptorhynchini* is present in a modified form, and which he subsequently thought ought to be transferred to the latter tribe; the genus *Eniopea* of the same author is characterised as having a true exposed *pygidium*, which would place it very far away from the tribe as M. Lacordaire characterised it, and *Orichora* (now placed among the *Tychiini*) was originally characterised by the same author as an *Erirhinid*. I have lately been studying a fairly large number of species of this and allied tribes, and have endeavoured to bring them into something like order.

The *Erirhinini* belong (in M. Lacordaire's classification) to Section B. of Phalanx I., in the aggregate of *Curculionidæ* which is called "Curculionides Phanerognathes Synmerides," and which is distinguished by the following characters:—Mentum not concealing the mouth organs, front coxæ contiguous, pygidium not visible, claws simple (*i.e.*, not dentate, appendiculate, or bifid), metasternum not very short, its episterna not very narrow. From the rest of the *Curculionidæ* possessing the above characters M. Lacordaire distinguishes the *Erirhinini* by the following characters in combination; antennæ geniculate, mesothoracic epimera not visible from above, submentum furnished with a peduncle, pronotum not distinct from the flanks of the prosternum, mandibles not (or scarcely) prominent, third joint of the tarsi not enormously dilated with the form of a palette, rostrum more or less elongate and slender and not of abnormal shape, tibiæ not of the strongly compressed form they take in the *Hylobiini*, corbels of the hind tibiæ open.

I think all species agreeing with the above diagnosis ought to be accounted *Erirhinini*, irrespective of the question whether their facies may happen to resemble that of another tribe, and that none making default of any of the characters mentioned above ought to be admitted. Consequently I am of opinion that Mr. Pascoe's second thoughts were not the best in removing

certain genera on account of their having the front part of the prosternum concave (as in the *Cryptorhynchini*), inasmuch as their front coxæ are contiguous, in spite of the prosternal concavity. If *those* genera must be eliminated others (*e.g.*, *Storeus*, *Bagous*, and *Emplesis*) must follow, and the character is itself so variable even within the limits of a genus as not to appear of importance higher, at any rate, than generic. The characters I have mentioned above as M. Lacordaire's seem to be really capable of more than generic application, although I cannot deny that some at least even of these are subject to *slight* modification. Thus there are species in which the pygidium is exposed *in the male only*, but I think their pygidium being covered in one sex may fairly relegate them to the *Erirhinini* (with which they agree in other characters); and there are abnormal species in which the front coxæ are not quite contiguous, but in every case these, I think, are so manifestly even *congeneric* with species having the front coxæ contiguous that it would be impossible to treat the peculiarity as more than abnormal.

In the next of this series of memoirs I hope to give a tabulation of all the Australian genera of *Erirhinini*, the tribe having now become so unwieldy that such an aid to its classification seems sorely needed. The present memoir contains the description of a part of the large mass of new genera and species in my hands, and I hope to complete the description of them in the next memoir of the series.

I have to acknowledge with much gratitude the extremely valuable assistance I am receiving in the preparation of these articles on *Erirhinini* and other *Curculionidæ* by the co-operation of George Masters, Esq., the author of the "Catalogue of Described *Coleoptera* of Australia" (a work of the very highest importance to Australian students), who is allowing me to examine his collection of authentic types of Mr. Pascoe's genera. I have also to thank several workers (especially Messrs. French, of Melbourne, and Lea, of Sydney), for placing their collections of *Curculionidæ* at my disposal.

AOPLOCNEMIS.

A. tasmanicus, sp. nov. Mas. Angustus; elongatus; nitidus; rufus, nonnullorum exemplorum pedibus piceis, corpore subtus toto prothoracis linea media scutello et in elytris maculis nonnullis dense niveo-squamosis; rostro quam prothorax sat longiori, punctulato, ad latera sat fortiter supra in medio obsolete strigato; antennis sat elongatis, funiculi articulo basali quam 2us manifeste breviori; prothorace quam latiori longiori, leviter nec crebre ruguloso-punctulato; elytris striatis, striis puncturis magnis quadratis instructis, interstitiis sat fortiter convexis. Long. (rostr. incl.), $5\frac{3}{4}$ l.; lat., $1\frac{3}{5}$ l.

This species is distinguished by its narrow elongate form, its prothorax being to the eye considerably (and by measurement slightly) longer than wide. Its prothorax has no white squamosity on the upper surface except the median line. Compared with *A. phaleratus*, Er., its rostrum is evenly convex above with scarcely distinct longitudinal sculpture, the prothorax is more feebly and much less closely rugulose. The white markings formed by scales on the elytra are a blotch behind the scutellum, a spot on each side of the suture about the middle of its length, two spots close to each other on the lateral declivity slightly in front of the middle, a marginal vitta in the hinder half, and a vitta running forward (from the apex) on the disc to near the middle of the length, and ending about half-way between the suture and lateral margin.

Tasmania; given to me by A. Simson, Esq.

SYMBOTHINUS (Proc. Linn. Soc., N.S.W., 1890, p. 582).

S. puer, sp. nov. Sat elongatus; piceus, squamis umbrinis et nonnullis albidis (his in prothorace indeterminate trivittatim, in elytris maculatim, dispositis) vestitus, corpore subtus sat dense albido-squamoso; rostro supra æquali, quam prothorax paullo longiori; hoc vix transverso, crebre sat fortiter ruguloso, lateribus parum rotundatis; elytris vix striatis, striis sat fortiter punctulatis, interstitiis vix convexis; corpore subtus sat crasse punctulato; tarsorum articulo apicali minus exserto. Long., 1 l.; lat., $\frac{1}{3}$ l.

Much smaller than *S. squalidus*, Blackb., with the legs and antennæ of dark colour; the rostrum scarcely showing any trace of longitudinal sculpture, the prothorax less rounded laterally, the elytra marked with numerous small spots of whitish scales, which are somewhat evenly distributed (not most conspicuous at the shoulders), the apical joint of the tarsi less exserted, &c.

N.S.W.; Glen Innes. Mr. Lea.

OLBIODORUS (gen. nov., *Erirhininarum*).

Corpus squamosum et capillis erectis elongatis vestitum; rostrum sat elongatum (maris quam feminæ brevius) modice robustum, minus arcuatum, subcylindricum; scrobes flexuosæ, laterales, (maris multo, feminæ vix) ante medium rostrum positæ; scapus oculum vix attingens; funiculus 7-articulatus; oculi parvi rotundati, tenuiter granulati; prothorax breviter subconicus, basi vix bisinuata, lobis ocularibus nullis; scutellum minutum; elytra prothorace fere duplo latiora, subquadrata; prosternum antice sat fortiter emarginatum, ante coxas breve; coxæ intermediæ approximatæ; femora mutica; tibiæ anticæ apicem versus falcatæ; tarsorum

articuli basales 3 breves, his conjunctis quam articulus 4us haud longioribus, 3° bilobo; unguiculi sat magni, divergentes; segmentum ventrale 2um quam 3um 4um que conjuncta brevius, ultimo brevi, suturis sat rectis.

The front tibiæ passing gradually at the apex into the mucro, which thus becomes a continuation of the tibiæ, will distinguish this genus, I think, from all the other Australian *Erirhininæ* except *Œnochroma* from which it differs *inter alia* by the much shorter basal joints of its tarsi.

O hirsutus, sp. nov. Sat brevis; rufus vel rufo-testaceus, rostri apice summo nigro; squamis concoloribus et nonnullis albidis intermixtis (his plus minusve distincte vittatim in prothorace elytrisque condensatis) totus densissime vestitus et capillis erectis valde elongatis (alteris albis alteris nigris) instructus; rostro quam prothorax (maris vix, feminæ manifeste) longiori, sat robusto, parum arcuato, supra reticulatim strigato; antennis modice elongatis, funiculi articulis basalibus 2 elongatis ceteris brevibus inter se sat æqualibus; prothorace crebre sublongitudinaliter ruguloso-punctulato; elytris quam prothorax multo latioribus, leviter striatis, striis puncturis sat magnis (his minus crebre dispositis) impressis, interstitiis vix convexis, humeris obtusis. Long. (rostr. incl.), 2$\frac{1}{5}$ l.; lat., 1 l.

The facies of this insect is much like that of *Nedyleda* (as figured in Journ. Linn. Soc., 1872, t. 12, fig. 9), but the sides of its elytra are less rounded. The rostrum is much like that of a *Rhachiodes* (e.g., *R. granulifer*, Chev.), although that of the male is shorter than of any male *Rhachiodes* known to me. The vestiture is much like that of *Olanæa*, but the erect hairs are much longer than in any *Olanæa* that I have seen. The tarsi are like those of *Desiantha*, except in the claws not being divaricate. The squamosity is so dense as entirely to hide the sculpture, which I have described from an abraded specimen.

S. Australia; Eyre's Peninsula.

PLÆSIORHINUS (gen. nov. *Erirhininarum*).

Sat elongatus; minus dense squamosus; rostrum elongatum (maris quam feminæ brevius) sat gracile, arcuatum, quadrangulare; scrobes laterales paullo obliquæ, ante medium rostrum positæ; scapus oculum vix attingens; funiculus 7-articulatus; oculi modici, sat tenuiter granulati; prothorax parum transversus subcylindricus, basi subtruncata, lobis ocularibus distinctis; scutellum distinctum; elytra quam prothorax sat latiora, elongato-obovata; prosternum antice sat fortiter emarginatum, ante coxas minus elongatum; coxæ intermediæ approximatæ; femora mutica; tibiæ anticæ

ad apicem bicalcaratæ (nonnullorum exemplorum calcare uno carenti; ? abrupto); tarsi elongati, articulo 3° bilobo, 4° quam 1us vix longiori; unguiculi divergentes; segmentum ventrale 2um quam 3um 4um que conjuncta longius, quam ultimum brevius, suturis intermediis ad latera angulatis.

The facies of this genus is very much like that of *Aoplocnemis*, from which it differs by its quadrangular (in transverse section) rostrum with lateral scrobes, its prosternum notably shorter in front of the coxæ, the shorter third and fourth segments and the longer fifth segment of its abdomen; its intermediate ventral sutures distinctly produced hindward at the sides, its bi-calcarate front tibiæ resembling those of *Hedyopis*, &c. The additional mucro of the front tibiæ must, I think, be easily broken off, as it is wanting on one tibia in one of the examples before me, and on both in another example. The quadrangular form of the rostrum is also found in *Nemestra*, but the rostrum of that genus is very much more robust, and it differs also in many other characters.

P. notatus, sp. nov. Minus nitidus; rufus, corpore subtus et antennarum clava infuscatis; squamis niveis ornatus, his in prothorace vittas 2 (in elytris breviter continuatas) et in elytris fascias singulas obliquas postmedianas nec latera nec suturam attingentes formantibus; rostro quam prothorax (maris vix, feminæ manifeste) longiori, ad basin punctulato et longitudinaliter striato, antice fere lævi; antennis sat elongatis, funiculi articulis 1° 2° que conjunctis (hoc quam illo longiori) quam ceteri conjuncti vix brevioribus; capite prothoraceque sat grosse punctulatis; elytris sulcato-punctulatis, interstitiis subcostatis, subtiliter granulatis, humeris obtusis. Long. (rostr. incl.), 2–2$\frac{1}{2}$ l.; lat., $\frac{4}{5}$–$\frac{9}{10}$ l.

S. Australia.

N.B.—A Victorian example, in very bad condition, is probably a variety, differing in the much longer fascia of the elytra, which almost reaches both suture and lateral margins.

DESIANTHA.

D. vittata, sp. nov. Oblonga; nigra; antennis (clava excepta) pedibusque plus minusve rufescentibus, supra squamis piceis griseo-brunneisque intermixtis vestita (his in prothorace trivittatim dispositis, in elytris interstitia alterna vestientibus); rostro robusto quam prothorax vix longiori, longitudinaliter sat fortiter strigato; funiculi articulo basali quam 2us vix longiori; prothorace leviter transverso crebre ruguloso; elytris sat fortiter punctulato-striatis, interstitiis alternis leviter convexis; tibiis anticis intus subtiliter denticulatis. Long. (rostr. incl.), 2$\frac{3}{4}$–3 l.; lat., 1–1$\frac{1}{5}$ l.

Maris metasterno postice et segmentis basalibus 2 longitudinaliter sulcatis ; elytris ad apicem simplicibus.

Feminæ corpore subtus haud sulcato; elytris singulis ad apicem ut processus conicus productis.

This species seems to be near *D. caudata*, Pasc , but that insect is described as "pale ferruginous" in colour, and there is no remark on its elytral interstices being of alternately different colours. In my tabulation of the species of *Desiantha* (P. L. S. N.S.W., 1890, p. 326) this one falls beside *D. obscura*, from which the pale brown vittæ on its elytra at once distinguish it.

Victoria.

D. pusilla, sp. nov. Minus elongata; picea, squamis sordide brunneis vestita, pedibus (tarsis exceptis) et antennis (clava excepta) plus minusve rufescentibus ; prothorace minus subtiliter vix confertim vix rugulose punctulato ; elytris punctulato-striatis, interstitiis convexis (nonnullis quam cetera magis elevatis), setulis (retrorsum curvatis) ornatis, interstitiis 4° 5° 6° que postice conjunctis manifeste nodulosis.

Maris metasterno et segmentis basalibus 2 sulcatis ; rostro brevi, sat crasso, longitudinaliter sat distincte strigato. Long., $1\frac{3}{5}$ l.; lat., $\frac{1}{2}$ l.

This species is extremely close to *D. parva*, Blackb., but I think it is distinct. The male is much smaller than the male of *D. parva*, and is evidently less parallel and wider ; its rostrum is distinctly shorter and stouter with its upper surface distinctly sculptured, having three quite well-defined fine longitudinal lines on each side of the central line (whereas in *D. parva* the central line alone is clearly traceable) ; the antennæ are a little shorter and stouter.

The two or three examples (all males) that I have seen are more or less clothed with a dirty indumentum, the removal of which takes off the scales also, so that I am unable to give a satisfactory description of the colours in a well-marked specimen, but as far as I can judge the lighter-coloured scales (as in *parva)* run in three ill-defined vittæ on the prothorax, the lateral ones being slightly continued on the elytra ; they appear to be devoid of the slight coppery gloss which distinguishes the scales on *D. parva.*

Victoria ; sent by Mr. French.

EPACTICUS (gen. nov. *Erirhininarum).*

Sat elongatus ; squamis crassis vestitus ; rostrum sat gracile sat elongatum (fere ut *Gerynassæ* sed paulo brevius), arcuatum, subcylindricum ; scrobes laterales obliquæ præmedianæ ; scapus oculum attingens ; funiculus 7-articulatus ; oculi modici sat grosse granulati ; prothorax plus minusve cylin-

dricus quam elytra parum angustior, lobis ocularibus nullis; scutellum manifestum; prosternum antice fortiter emarginatum, ante coxas modice elongatum; coxæ intermediæ minus approximatæ; femora mutica; tibiæ anticæ ad apicem intus mucronatæ; tarsi robusti sat elongati, articulo 3° fortiter bilobo, 4° quam ceteri conjuncti haud multo breviori; unguiculi divaricati; segmentum ventrale 2um quam 3um 4um que conjuncta vix longius, ultimum sat breve, suturis intermediis sat rectis.

This genus is remarkable for the extreme coarseness of the scales with which it is clothed. Its structural characters are in general very similar to those of *Empira* (a genus that I do not think I have seen), but Mr. Pascoe says that the rostrum of *Empira* is exceptionally thick for an *Erirhinid*, and that its facies is of *Hypera* rather than *Erirhinus*: whereas the rostrum and facies of this genus are entirely *Erirhinus*-like, so I think there can be no doubt of the distinctness of the genera. Mr. Pascoe, moreover, does not refer to the scales of *Empira* as being coarse—a character that it would seem impossible that he could have passed over if he had had this genus before him. It may be noted that this genus bears a remarkable superficial resemblance to an uncharacterised genus, which on account of its dentate claws cannot be referred to the *Erirhininæ*, and which I hope to characterise shortly.

E. ruber, sp. nov. Rufus, abdomine (segmento apicali excepto) infuscato; squamis crassissimis subrotundatis (his albis rufescentibusque indeterminate intermixtis) vestitus; funiculi articulo basali quam sequentes 2 vix breviori; rostro (fem. ?) quam prothorax paullo longiori, punctulato; prothorace vix transverso, crebre subtilius ruguloso; elytris elongatis leviter ovatis, punctulato-striatis, interstitiis leviter convexis. Long. (rostr. incl.), $1\frac{2}{5}$ l.; lat., $\frac{1}{2}$ l. (vix).

In outline this species is much like *Erirhinus tæniatus*, F. The entire insect is clothed with whitish scales, mingled with some of a reddish tone of colour, but to a casual glance the squamosity appears altogether whitish.

S. Australia; Eyre's Peninsula.

E. nigrirostris, sp. nov. Præcedenti affinis; capite rostroque nigris (hoc longitudinaliter manifeste strigato), prothorace antennis (scapo excepto) tarsisque picescentibus; squamis elongatis vestitus. Long., $1\frac{1}{10}$ l.; lat., $\frac{1}{3}$ l.

The much smaller size and different colouring of this insect seem to distinguish it from the preceding, and the different shape of its scales, which are (not round but) elongate—resembling adpressed setæ—seems inconsistent with specific identity.

S. Australia; near Adelaide.

ENCOSMIA (gen. nov. *Erirhininarum*).

Sat elongata; dense squamosa; rostrum sat elongatum (maris quam feminæ brevius), modice robustum (fere ut *Gerynassæ*), modice arcuatum, subcylindricum; scrobes laterales sat obliquæ præmedianæ; scapus oculum attingens; funiculus 7-articulatus; clava antennarum distincte articulata; oculi sat magni grosse granulati; prothorax subcylindricus, antice modice angustatus, quam elytra paullo angustior, lobis ocularibus distinctis; scutellum distinctum; prosternum antice fortiter emarginatum, ante coxas modice elongatum; coxæ intermediæ minus approximatæ; femora mutica; tibiæ anticæ ad apicem intus mucronatæ; tarsi robusti, sat elongati, articulo 3° fortiter bilobo, 4° brevi quam 3us vix longiori; unguiculi divaricati; segmentum ventrale 2um quam 3um 4um que conjuncta paullo longius, ultimum sat breve; suturæ intermediæ ad latera vix angulatæ.

This genus has a very *Erirhinus*-like facies. Its characters are in the main much like those of the preceding genus, from which however *inter alia* its well-developed ocular lobes and short claw-joint separate it very readily. It also bears a considerable resemblance to *Emplesis*, with which, however, its mucronate front tibiæ, stouter rostrum, prosternum without any trace of excavation, shorter intermediate ventral segments, &c., will prevent its being confused. I do not find any definite character to separate it from Mr. Pascoe's *Empira* (as described), but as in the case of the preceding genus the statement that *Empira* has the facies of *Hypera* seems altogether inconsistent with possible identity, and there are several minor respects in which it does not agree satisfactorily with Mr. Pascoe's diagnosis. The structure of the antennal club is very like that of *Eniopea*, though the joints are a little more closely compacted together.

E. Adelaidæ, sp. nov. Sat elongata; ferruginea, metasterno medio et abdominis basi infuscatis; squamis sat magnis ferrugineis cinereis umbrinisque intermixtis vestita; rostro punctulato, vix distincte strigato; funiculi articulis basalibus 2 sat elongatis (basali quam 2us paullo longiori), ceteris sat brevibus; prothorace leviter transverso, antice paullo angustato, supra crebre subtilius ruguloso, lateribus leviter arcuatis; elytris punctulato-sulcatis, interstitiis subcostatis; corpore subtus fortiter sat crebre punctulato.

Maris rostro quam prothorax vix, feminæ sat manifeste, longiori. Long. (rostr. incl.), $1\frac{3}{4}$ l.; lat., $\frac{3}{5}$ l.

In good specimens the sculpture is entirely buried beneath the squamosity. The arrangement of the differently-coloured scales is too confused for very accurate description; the ashy-coloured

scales, however, run on the prothorax more or less distinctly in longitudinal lines, and on the elytra form a figure more or less like a misshapen X with the apex of one of its arms on each shoulder; while the scales of darkest colour form a more or less badly-defined somewhat triangular patch on each elytron, having its apex near the middle of the suture, and its base on the lateral margin. Abraded specimens are entirely ferruginous on the upper surface.

S. Australia; Adelaide district.

E. infuscata, sp. nov. Minus elongata; ferruginea, metasterno abdomine (apice excepto) antennisque (scapo excepto) infuscatis; squamis ferrugineis albidis et umbrinis intermixtis vestita; his umbrinis in prothorace basin versus maculas 2 et in elytris plagam communem magnam (discum totum tegentibus) formantibus; cetera fere ut *E. Adelaidæ*. Long. (rostr. incl.), $1\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l.

Unfortunately this species is unique in my collection, so that I cannot afford to have its scales removed, but as far as I can judge the underlying sculpture is much the same as in *E. Adelaidæ*, except that the ocular lobes are not quite so well developed. Taking the ferruginous scales as forming the ground-colour of the upper surface, the whitish scales are thinly and inconspicuously sprinkled everywhere, and the dark-brown scales form two spots at the base of the prothorax, and cover the greater part of the elytra, so that only the sides and apex are of the lighter colour.

Victoria.

ENIOPEA.

Through the courtesy of Mr. Masters, I have been able to examine some examples of *E. amœna*, Pasc. I have in my collection some specimens (from Albany) of a very closely allied species, but as they are all more or less abraded, I do not feel quite sure that they are specifically distinct from *amœna*, so I pass them by for the present, though I feel little doubt of their distinctness.

The genus presents a good deal of difficulty, because I have species before me from various parts of Australia which do not seem structurally different from the typical species, and yet recede considerably from it in facies. I decide to assign them to *Eniopea*, although I think it probable that if Mr. Pascoe had dealt with them he would have treated some of them as requiring new generic names. I call, then, all the species *Eniopea* (regardless of their degree of general resemblance to *E. amœna*) which present the following characters (in addition to those common to all *Erirhinina*):—Funicle seven-jointed, scape not passing front of eye, scrobes lateral, antennal club elongate and having very

distinct joints, rostrum elongate and more or less cylindric, eyes strongly granulate, femora unarmed, front tibiæ normally mucronate, third joint of tarsi bilobed, fourth joint of tarsi well exserted and having divaricate claws, prothorax without ocular lobes, the apical ventral segment elongate (not shorter than the second segment), male with a distinct pygidium.

Mr. Pascoe says that the principal characters of *Eniopea* are the distinctly (almost loosely) articulated antennal club and the exceptional structure of the apical segment in one sex. The abdominal characters in the following species are quite as in *A. amœna ;* but the antennal club, though exceptionally elongate, and very distinctly articulate in them all, is not quite so remarkable as in the typical species.

E. posticalis, sp. nov. Oblonga ; ferruginea, squamis ferrugineis ochraceis albidisque variegata, antennis (scapo excepto) obscurioribus ; rostro quam prothorax vix longiori ; funiculi articulo basali quam 2us sat (sed minus quam duplo) longiori ; prothorace quam longiori vix latiori, ochraceo-trivittato, lateribus modice rotundatis ; elytris punctulato-striatis. Long. (rostr. incl.), $1\frac{2}{5}$ l. ; lat., $\frac{1}{2}$ l. (vix).

Differs from *E. amœna*, *inter alia*, by the slightly shorter and slightly more compactly articulated club of its antennæ, by the comparatively longer second joint of the funicle, and by the different pattern and colour of the scales on the upper surface. Taking the ferruginous scales as the ground-colour, the rostrum is seen to be sprinkled with whitish scales, and the prothorax to bear three vittæ formed of ochreous scales (the external vittæ marked with white), while the elytra are marked chiefly with whitish scales, which are scattered about the base, and form a V-shaped mark with its extremities on the shoulders, and its apex about the middle of the suture, as well as a very conspicuous transversely oval spot on the suture considerably behind the middle (in front of and behind which the ground-colour is darker than on the rest of the surface). The colours and pattern are a good deal like those of some species of *Emplesis*, but the structural characters are very different from those of that genus.

N.S. Wales ; Tamworth ; taken by Mr Lea.

E. tenebricosa, sp. nov. Oblonga ; nigra, squamis albidis nigricantibusque minus distincte variegata, pedibus ferrugineis, femoribus mediis et tarsis infuscatis ; rostro quam prothorax (maris vix, feminæ manifeste) longiori ; funiculi articulo basali quam 2us sat (sed minus quam duplo) longiori ; prothorace quam latiori fere longiori, lateribus minus rotundatis ; elytris punctulato-striatis. Long. (rostr. incl.), $1\frac{1}{2}$ l. ; lat., $\frac{1}{2}$ l.

A blackish species with pale-grey and blackish scales inter-

mixed, so as to present to a casual glance a confused appearance, with very little pattern. On careful inspection there are seen to be three feebly-defined pale vittæ on the prothorax, and an indeterminate blackish fascia behind the middle of the elytra, in which the scales are somewhat fasciculated (so as to present a tubercled appearance) near the suture on either side. There are species in several genera closely resembling this in the colour and arrangement of scales, notably *Cydmæa diversa*, Blackb. (which, however, is a much broader insect with subconical prothorax and more finely granulated eyes), and a *sp.*, which will be described in a future paper.

Victoria; sent by Mr. French.

E. sydneyensis, sp. nov. Oblonga (mari magis elongato); picea vel rufo-picea, antennis pedibusque magis rufescentibus; squamis concoloribus et nonnullis albidis vestita; rostro quam prothorax vix longiori, longitudinaliter carinis subtilibus ornato; funiculi articulo basali quam 2us sat (sed minus quam duplo) longiori; prothorace quam latiori fere longiori, albido-trivittato, lateribus minus rotundatis; elytris punctulato-striatis, in humeris albido-squamosis et fascia brevi communi postmediana (hac in sutura retrorsum producta) albido-squamosa ornatis. Long. (rostr. incl.), 1$\frac{3}{5}$ l.; lat., $\frac{3}{5}$ l. (vix).

The pattern formed by the whitish scales renders this species fairly easy to recognise. It consists of three vittæ on the prothorax, a spot on each shoulder, and a common mark on the hind one-third of the elytra resembling the letter T, but in some examples this resemblance is obscured by the lower part of the stem being dilated. In one example there are indications of a whitish spot about the middle of the suture. Differs from *E. tenebricosa* by its different and better defined markings, its shorter rostrum (especially in the female), antennæ with the scape decidedly red and more robust, &c. In the male the metasternum and basal ventral segment are longitudinally concave.

N.S. Wales; taken by Mr. Lea near Sydney.

EMPOLIS (Proc. Linn. Soc., N.S.W., vol. V., 1890, p. 342).

This genus is in many respects near to *Eniopea*, but may be distinguished from it at once by the possession of well-defined ocular lobes.

E. longipes, sp. nov. Sat elongatus; subparallelus; ferrugineus, squamis concoloribus et nonnullis albidis et pallide ochraceis intermixtis (his ad prothoracis latera et ad elytrorum apicem condensatis) vestitus; antennarum funiculi articulo 2° quam 1us haud breviori; elytris punctulato-striatis. Long. (rostr. incl.), 2 l.; lat., $\frac{3}{5}$ l. (vix.)

The ferruginous scales on the elytra are of a darker tone than elsewhere; regarding them as the ground colour the markings consist of a pale ochraceous spot on each shoulder, and a large common blotch of the same colour (with a few whitish scales intermixed) occupying the apical one-third of the elytra, but not quite reaching the lateral margins except close to the apex. The longitudinal carinæ on the rostrum are very feeble. The prothorax is very nearly as long as wide, and is very evidently constricted a little behind the front margin; its sides are somewhat strongly rounded. The rostrum of the male is scarcely (of the female considerably) longer than the prothorax. Compared with *E. angustatus*, Blackb., the prothorax is evidently more elongate and the legs are distinctly longer (especially the front pair), with the apical joint of the tarsi less strongly exserted. The colour and markings are quite different from those of *E. angustatus*.

S. Australia; Adelaide district.

E. Leai, sp. nov. Sat elongatus; minus parallelus; piceus, squamis concoloribus et nonnullis albidis et pallide ochraceis intermixtis (his ad prothoracis latera et ad elytrorum partes anticas laterales apicemque condensatis) vestitus; antennarum funiculi articulo 2° quam 1us vix breviori; elytris punctulato-striatis. Long. (rostr. incl.), $2\frac{1}{10}$ l.; lat., $\frac{7}{10}$ l.

This species resembles the preceding in its markings, but its pitchy black colour (the antennæ, rostrum, and tarsi more or less reddish) will at once distinguish it. Its prothorax is distinctly transverse (even more so than that of *E. angustatus*), and is evidently constricted behind the front margin, with its sides rounded more strongly than in either species previously described. The rostrum is in both sexes about as long as that of *E. longipes*, and is very distinctly marked with fine longitudinal carinæ. The pale-coloured scales occupy the great part of the prothorax—the middle part being of the darker colour—and on the elytra they form a large ill-defined patch on the sides of the basal portion, and cover the whole apical two-fifths of the surface. The general build of the insect is markedly less narrow and parallel than in *E. angustatus* and *longipes*.

N.S. Wales. Taken by Mr. Lea near Tamworth.

EMPLESIS.

E. majuscula. sp. nov. Fem. Ovalis; sat robusta; ferruginea rostro læte rufa; squamis ferrugineis albidisque indeterminate intermixtis vestita; funiculi articulo 2° quam 1us paullo breviori quam 3us duplo longiori, articulis nullis transversis; rostro gracili arcuato, quam prothorax triplo longiori; prothorace in partibus posterioribus 3 quadrato fortiter transverso, in parte anteriori quarta fortiter con-

stricto et valde angustato ; elytris punctulato-striatis, interstitiis alternis subcostatis, callo subapicali valde distincto. Long. (rostr. excl.), $2\frac{1}{2}$ l.; lat., $1\frac{1}{10}$ l.

An insect which I believe to be the male of this species is in the collection of Mr. Lea. Its rostrum is shorter (scarcely twice as long as the prothorax) ; its front tibiæ are fringed internally in their apical half with very long whitish hairs, and its undersurface is longitudinally sulcate, the sulcus ending on the apical ventral segment in a large transversely oval impression; the scales on its head, the middle of its prothorax, and the front half of its elytra are of a dark-brown colour. The peculiar shape of the prothorax and very remarkable sculpture of the elytra are as in the type ; it is from the same locality. The prosternum is indistinctly concave in front of the coxæ.

N.S. Wales ; Gosford.

EPAMŒBUS (gen. nov. *Erirhininarum.)*

Corpus squamis setiformibus adpressis vestitum ; rostrum sat gracile, modice elongatum (maris quam feminæ brevius), sat arcuatum, subcylindricum ; scrobes laterales (maris antemedianæ, feminæ medianæ) ; scapus oculum vix attingens ; funiculus 7-articulatus ; oculi grosse granulati ; prothorax sat brevis, antice angustatus, basi bisinuata, lobis ocularibus nullis ; scutellum distinctum ; elytra quam prothorax manifeste latiora, ovalia ; prosternum antice vix emarginatum, ante coxas sat elongatum ; coxæ intermediæ inter se sat distantes ; femora mutica ; tibiæ anticæ haud mucronatæ ; tarsorum articuli basales 2 breves, 3° alte bilobo, 4° quam ceteri conjuncti haud multo breviori ; unguiculi divaricati ; segmenta ventralia 3um 4um que conjuncta quam 2um vix breviora, ultimo sat brevi ; suturæ ventrales intermediæ rectæ.

E. scutellaris, sp. nov. Ovalis ; rufo-testaceus, corpore subtus antennarum clava et (nonnullorum exemplorum) prothorace infuscatis ; squamis setiformibus albidis ornatus ; rostro quam prothorax (maris vix, feminæ manifeste) longiori, supra punctulato ; antennis minus elongatis, funiculi articulo basali elongato, ceteris brevibus ; prothorace transverso, antice angustato, supra sat grosse nec rugulose punctulato, pone apicem leviter constricto, lateribus leviter arcuatis ; scutello dense albo-squamoso ; elytris vix striatis seriatim punctulatis, humeris obtusis. Long. (rostr. incl.), 1 l. ; lat., $\frac{2}{5}$ l.

The whitish hair-like scales are not very conspicuous or closely set, except on the scutellum, and in some parts are much more sparse than in others, giving the appearance of ill-defined denuded

spots, of which there are several on the prothorax and on the elytra, one on each side of the suture near the front, and one wide and fascia-form about the middle.

S. Australia; Eyre's Peninsula.

GERYNASSA.

G. Andersoni, sp. nov. Minus brevis; subparallela; picea vel ferruginea, antennis pedibusque testacco-rufis (nonnullorum exemplorum femoribus infuscatis); squamis piceis et ferrugineis vel albidis variegata; funiculi articulo 2° quam 1us manifeste breviori; rostro quam prothorax (maris vix, feminæ manifeste) longiori, longitudinaliter manifeste strigato; prothorace sat fortiter transverso; elytris punctulato-striatis, interstitiis 3° 5° que interrupte leviter costatis. Long. (rostr. incl.), $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

Variable in colour and markings; as far as I have observed, the rostrum of the female is always ferruginous, of the male always piceous. The club of the antennæ is scarcely at all infuscate. Taking the lighter-coloured scales (which vary from grey to ochraceous) as the ground-colour, there is generally at the base of the prothorax a large dark spot, which is continued back to cover the scutellar region, but in some examples only its lateral edges run back—forming a line on either side of the scutellum. The dark scales are variously mottled over the surface of the elytra, but usually they are conspicuous on the elevated portions of the third and fifth interstices, giving those elevations the appearance of elongate feeble black tubercles.

Its small size in combination with the comparatively short second joint of its funiculus, the ferruginous antennal club, and the very feeble elevations of the third and fifth elytral interstices distinguish this species from its previously-described congeners. I have named it after Mr. John Anderson of Port Lincoln.

S. Australia; Eyre's Peninsula.

G. picticornis, sp. nov. Sat brevis; picea vel ferruginea, antennarum scapo pedibusque rufis, antennarum funiculo clavaque piceis; squamis ochraceis nigro-piceisque variegata; funiculi articulo 2° quam 1us haud breviori; rostro (feminæ) quam prothorax multo longiori, longitudinaliter manifeste strigato; prothorace sat transverso; elytris punctulato-striatis, interstitiis 3° 5° que interrupte costatis. Long. (rostr. incl.), 2 l. (vix.); lat., $\frac{4}{5}$ l.

This is a prettily-marked species; the ochraceous scales being regarded as forming the ground-colour, the blackish markings consist of three narrow vittæ on the prothorax, which run back a short distance on the elytra, and on each elytron a triangular

blotch having its base on the lateral margin as well as some small dispersed spots; the elevated parts of the interstices also are blackish. These markings are more or less distinct on all the examples I have examined. The variegated antennæ seem to be a reliable character, the scape being testaceous red, the basal two joints of the funiculus nearly black, the rest of the funiculus piceous, the club black.

N.S.W.; taken by Mr. Lea at Glen Innes.

G. simplex, sp. nov. Minus brevis; subparallela; picea vel ferruginea, antennis (clava excepta) pedibusque (nonnullorum exemplorum femoribus infuscatis) rufo-testaceis; squamis albido-griseis subsericeis sat æqualiter minus dense vestita; funiculi articulo 2° quam 1us haud breviori; rostro quam prothorax (maris vix, feminæ paullo) longiori, longitudinaliter punctulato minus distincte strigato; prothorace modice transverso, lateribus fortiter rotundatis; elytris punctulato-striatis, interstitiis sat æqualibus. Long. (rostr. incl.), $1\frac{3}{4}$ –2 l.; lat., $\frac{7}{10}$—$\frac{4}{5}$ l.

Differs from its previously described congeners, except *G. Andersoni*, in its evidently more parallel and less short build. From *Andersoni* it differs by the longer second joint of its funiculus, its elytral interstices almost devoid of inequalities, and the very strongly rounded sides of its prothorax. In the examples that I have seen there is no pattern formed by differently coloured scales, but the whole surface is somewhat thinly clothed with whitish-grey scales having a slightly silky lustre. If, however, the insect be examined somewhat obliquely, with its head towards the observer, the basal-half of the elytra appears to be of a dark-colour and the apical-half whitish, but this appears to be due only to the way in which the light falls upon the scales.

N.S. Wales.

NIPHOBOLUS (gen. nov., *Erirhininarum*).

Corpus modice elongatum, squamosum; rostrum sat breve sat robustum (fere ut *Bagoi*), leviter arcuatum, subcylindricum; scrobes præmedianæ obliquæ infra rostrum directæ; scapus oculum vix attingens; funiculus 6-articulatus; oculi grosse granulati; prothorax modice cylindricus antice angustatus, basi vix bisinuata, lobis ocularibus nullis; scutellum minus distinctum; elytra quam prothorax sat latiora; prosternum antice leviter emarginatum, ante coxas minus elongatum; coxæ intermediæ inter se sat approximatæ; femora mutica sed subtus subangulata; tibiæ anticæ ad apicem mucronatæ; tarsorum articuli basales 2 sat breves, 3° elongato fortiter bilobo, 4° vix exserto; unguiculi elongati graciles subdivaricati; segmenta ventralia 3um 4um que conjuncta

quam 2um multo breviora, ultimo sat brevi ; suturæ ventrales intermediæ ad latera vix angulatæ.

The general resemblance of this genus to *Bagous* is most noticeable, although its structural characters do not indicate any close affinity to that genus. Its most striking peculiarity is to be found, I think, in the tarsi, which are comparatively short and wide, slightly and evenly increasing in width from the base to the apex of the third joint, this latter being deeply and widely bilobed, and almost reaching beyond the fourth joint ; the claws long and slender, like those of *Bagous*, and remarkable as being (neither truly divergent nor truly divaricate, but) separated almost as abruptly as if they were divaricate, yet with their axes not quite at right angles to a line running down the centre of the fourth joint of the tarsus. The genus also differs from *Bagous* by its six-jointed funiculus, its more coarsely granulated eyes, its prothorax without ocular lobes, its prosternum not excavated, and its shorter and stouter legs. The combination of six-jointed funiculus, claw joint scarcely exserted, and rostrum comparatively short and robust, distinguishes it, I think, from all previously described genera of *Erirhininæ*. It appears to me possible that it is identical with *Notionomus*, Er., but no description of that genus has been published ; the species (*N. australis*, Er.) on which *Notionomus* was founded I have not seen (it was unknown to M. Lacordaire), but though it is clearly from Erichson's description quite different specifically from that before me, its characters suggest the possibility of generic identity. Erichson subsequently stated that his *Notionomus* is identical with *Endalus*, in which case it is certainly not congeneric with the insect I am describing, as *Endalus*, *inter alia*, has a long slender rostrum.

N. deceptor, sp. nov. Piceus, antennis pedibusque rufescentibus, squamis albidis et nonnullis brunneis dense vestitus ; prothorace leviter transverso, pone apicem fortiter constricto crebre vix subtiliter punctulato ; elytris punctulato-striatis, interstitiis sat convexis setis brevibus seriatim instructis, humeris lateraliter subprominulis. Long. (rostr. incl.), $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l. (vix.)

To a casual glance this species bears a remarkable resemblance to the European *Bagous lutulentus*, Gyll., though differing very widely in its structural characters. In a fresh example every part is densely clothed with slightly shining scales, so small and closely packed as to simulate some extraneous indumentum. The prevailing colour of these scales is whitish, on which some brownish scales form a large feebly-defined blotch on the prothorax, and various blotches on the elytra generally of the form of two or three obscure fasciæ placed near the front, about the middle, and near the apex.

N.S. Wales ; taken by Mr. Lea near Tamworth.

The Gastropods of the Older tertiary of Australia.

Part IV. (including Supplement to Part III.).

By Professor Ralph Tate.

[Read October 17, 1893.]

Plates VI.–X.

FAMILY CYPRÆIDÆ.

Cypræa Mulderi, *Tate.*

(Trans. Roy. Soc. S. Aust., vol. XIII., 1892, pl. ix., f. 4; without description.)

Shell depressedly globose, spire concealed; basal outline oblong; back almost circular in basal outline, polished, marked with circular contusions varying from 4 to 5 mm. in diameter. Anterior canal abruptly upturned, flanked on each side by a broadly-triangular, slightly concave, thickened extension of the base. Posterior canal short, with very wide flanges, the left one more extended than the right. Base nearly flat, much thickened; outer lip excessively inflected, rounded, its inner margin set with nearly equal and somewhat slender rounded ridges; inner lip with a broad convex area steeply sloping inwards, the anterior-third furnished with about seven ridges narrower than the intervening sulcations, the rest of the lip edentulous.

Dimensions.—Total length, 100 mm.; width, 64 mm.; height, 50 mm.; length of back, 66 mm.

Localities.—Eocene; in a well-sinking at Belmont, near Geelong, one example, collected and presented by Mr. Mulder, to whom the species is dedicated; Bellarine Peninsula (Hall and Pritchard).

Affinity.—This species comes near to *C. platypyga*, McCoy, but the back is not pyriform, the anterior canal much reflected, and the shape of the base and details of the aperture are different; otherwise it might be regarded as a senile form of that species.

Subgenus Cyprædia, *Swainson*, 1840.

Dorsal surface with revolving threads or tessellated ornament. Distinguished from *Cypræovula*, Gray, 1824, by the absence of a posterior apertural notch. One living species, *C. cancellata*, is known, and there are five in the European Eocene.

Cyprædia clathrata, *Tate.*

(Trans. Roy. Soc. S. Aust., vol. XIII., 1892, pl. ix., fig. 1; without description.)

Shell oval-pyriform; anterior canal produced and somewhat dilated at the end. The surface is ornamented by revolving slender threads, alternately large and small, which are crossed by transverse threads equal in strength to the longitudinal secondaries; the intersections of the two sets of threads produce rectangular interspaces, which are very finely reticulate-striate. There are about ten primary revolving threads in about the middle-third of the dorsal surface, equal to 8 mm. of the axial length.

Dimensions.—Length, 27 mm.; width, 18 mm.

Locality.—Eocene marls, Blanche Point, Aldinga Bay. This species resembles *C. elegans*, Defr., but the pits between the primary threads are oblong, not square; the interstitial ornament is finely reticulate; and the canal is more produced and dilated.

FAMILY SCALARIIDÆ.

Crossea semiornata, *spec. nov.* Pl. x., fig. 10.

Shell depressedly conoidal, of four whorls; the first two convex.

The penultimate whorl is quadrate in section, ornamented with an elevated rounded carina at the shoulder, a similar one mid-way to the anterior suture, and a threadlet margining each suture, which is sub-canaliculate; the whole surface crossed by stout equidistant riblets, which are approximately axial on the anterior-half of the whorls, and produce rectangular pits between the revolving cinguli, on the posterior-half the riblets are oblique. The body-whorl is convex, interrupted in the posterior-third by a slight keel continuous with the posterior cinguli of the penultimate whorl; the ornament of the penultimate is continued on to the body-whorl, but gradually fades away at about a-half turn, the rest of the surface being polished and obscurely striated coincident with the outer lip.

Dimensions.—Length and width, 2 mm. (vix).

Locality.—Eocene; Bird-rock Bluff, Spring Creek, near Geelong (two exs.).

In my synopsis of the species (living and fossil) of this genus, *C. semiornata* will belong to section 2 of "group III." from the other members of which it is distinguishable by its fenestrated ornament and smooth body-whorl.

Scalaria (Acrilla) leptalea, *spec. nov.* Pl. x., fig. 1.

Shell thin, very slender, imperforated; ordinary whorls, six, convex, slightly angulated post-medially; nuclear whorls two and

a-half, smooth and polished, the anterior one angulated posteriorly, the next is slightly inflated ending in a bulbiform tip.

The posterior spire-whorls are distantly costated, the others are ornamented with curved lamelliform costæ, separated by little wider intervals.

Base of body-whorl flatly-rounded, smooth, angulated at the periphery; the peripheral keel crenulated; aperture oval, the major diameter axial.

Dimensions.—Length, 4; breadth, ·5.

Locality.—Eocene; Bullin Merri, near Camperdown (one ex.).

The nearest ally of this new species is *S. crebrelamellata*, from which it differs by its more slender shape, less crowded lamellæ, and the absence of spiral ornament on the base as well as on the whorls; the apex is also different, and the whorls are not so flat.

FAMILY NATICIDÆ.

Genus Natica.

SYNOPSIS OF SPECIES.

Umbilicus with a funiculus, without posterior callosity (Natica, s.s.).
- Shell thin, whorls slightly tabulated, funicular expansion thinly everted. 1. *Hamiltonensis.*
- Shell solid, whorls regularly convex, funicular expansion stout. 2. *subNoæ.*

Umbilicus more or less filled with a funicular callosity confluent with the columella-border (Neverita).
- Umbilicus filled with a callosity; shell hemisphæric. 3. *gibbosa.*
- Umbilicus almost concealed by posterior callosity; shell oblong-oval. 4. *vixumbilicata.*
- Umbilicus distinctly funiculate.
  - Shell narrow-oval, spire produced.
    - Length more than 2 x width, an antesutural band. 5. *balteatella.*
    - Length less than 2 x width, no sutural band. 6. *subvarians.*
  - Shell broadly oval, spire very short; body-whorl medially depressed. 7. *varians.*
  - Shell globose-conic, whorls ventricose; spire elevated. 8. *Wintlei.*
- Umbilicus not distinctly funiculate.
  - Shell globose, spire prominent. 9. *Mooraboolensis.*
  - Shell hemisphæric, spire almost concealed. 10. *substolida.*

Umbilicus simple, open; shell globulose (NATICINA).
Surface sculptured.
Surface grooved; shell solid. 11. *arata.*
Ornament of spiral wavy threads; shell thin. 12. *limata.*
Surface smooth, or nearly so.
Suture canaliculate, umbilicus small, not margined. 13. *polita.*
Suture impressed; umbilicus wide, margined; body-whorl inflated. 14. *perspectiva.*
Suture linear; umbilicus small, not margined. 15. *Aldingensis.*
Umbilicus simple, very large; shell depressed, auriform (SIGARETOPSIS). 16. *subinfundibulum.*

1. Natica Hamiltonensis, *Tate.* Pl. x., fig. 6.

N. Wintlei, var. *Hamiltonensis*, Tenison-Woods, Proc. Lin. Soc., N.S.W., vol. III., p. 229, tab. 21, fig. 8, 1878.

Shell globulose, fragile; spire short; whorls four and a-half, of very rapid increase, smooth or faintly wrinkled around suture; apical whorl flat, the others rotund, more abruptly sloping to the posterior suture; suture linear.

Aperture broadly oval, slightly oblique, outer and basal margins acute; columella slightly arched, thin, joined to the outer lip by a thin callus; umbilicus narrow, with a not very prominent funiculus, which is defined in front by a narrow groove, but the umbilicus is broader and deep behind it.

Dimensions of a large specimen:—Length, 20; width, 19; vertical height of aperture, 15; radius of aperture, 11; width of umbilicus, 2.

Localities.—EOCENE—Muddy Creek (very common)!; Mornington!; Bird-rock Bluff (rare)!; Cheltenham!; Gellibrand River!; Fyansford!; Turritella-beds, Aldinga Cliffs and Adelaide-bore!; River Murray Cliffs! MIOCENE—Kalima, Gippsland Lakes (rare)!

Remarks.—Tenison-Woods was acquainted with only immature examples (about 4 mm. diameter) of this species, which he referred under a varietal name to his *N. Wintlei.* In the adult stage, such as I have illustrated, the differences indicated between it and *N. Wintlei* are more accentuated. *N. Hamiltonensis* is a fragile shell, with a shorter spire and more convex whorls, whilst the absence of a callus on the posterior part of the columella is a very conspicuous feature.

Among living species with which I have compared it, it makes the nearest approach to *N. Zealandica*, Q. & G., but differs by more inflated spire-whorls and slender funiculus.

2. Natica subNoæ, *spec. nov.* Pl. vi., fig. 1.

Shell solid, smooth, shining, hemisphæric; whorls four and a-half, transversely finely-lined; suture concealed.

Aperture obliquely lunate, outer lip acute; columella nearly vertical; umbilicus wide, a funiculus in the anterior-third, narrow but elevated, terminating in a moderately large oval callosity, confluent in front with the columella, but separated above by a notch, beyond which the columella spreads slightly to join the outer lip.

Shelly opercula occur in association with this species at Spring Creek, which are very similar to those of such species of *Natica* (s.s.) as *N. millepunctata.*

Dimensions.—Length, 11; breadth, 10; length of columella, 8; width of aperture, 5; width of umbilicus, 2·55.

Localities. — Eocene; Bird-rock Bluff!; Muddy Creek!; Birregurra *(Mulder)!;* Table Cape!; Camperdown!.

Affinities.—This new species has a considerable resemblance to *N. Noæ*, D'Orb., *N. hemipleres*, Cossmann, and other allied species of the Parisian Eocene. From both it differs by concealment of the suture. In shape it is more like *N. hemipleres*, but its apical whorls are flatter. From *N. Noæ* it is distinguished by narrower shape, more oblique aperture, and stouter funicular dilatation more anteriorly situated.

3. Natica gibbosa, *Hutton.* Pl. vi., fig. 4.

Reference.—Trans. N. Zealand Inst., vol. XVIII., p. 334, 1886.

"Shell large, solid, smooth, gibbous, the spire almost buried; the body-whorl gibbous posteriorly. Aperture semicircular, the columella callus very large, filling the posterior portion of the aperture, and eventually covering the whole umbilical region."

Dimensions.—Length, 39; breadth, 37; diameter and radius of aperture, 34, 16·5.

Locality not actually known, but reported "a well-sinking in the Murray Desert;" the age is doubtfully Miocene.

Professor Hutton records the species from the Pareora system of New Zealand, and one occurrence from that of Wanganui.

4. Natica vixumbilicata, *Tenison-Woods.* Pl. x., fig. 9.

Reference.—Proc. Roy. Soc., Tasmania, for 1876, p. 111 (1877).

Synonym.—*N. ovata*, Tenison-Woods, op. cit., for 1875, p. 17, 1876, *non* Hutton.

Shell pyriformly oval, solid, smooth, shining. Whorls three and a-half, suture thinly covered; spire obtuse of two and a-half, rapidly increasing, slightly convex whorls; the apical-half whorl globose, its tip immersed. Last whorl very large, interruptedly

moderately convex (being slightly less convex medially); surface marked with slightly sinuous growth-lines (passing into somewhat wrinkled threads at the suture and at the umbilical margin) and interstitial fine striæ, and by inconspicuous revolving threads and towards the suture by fine striæ. Aperture semi-lunar, oblique; outer lip thin, slightly sinuated (projecting slightly forward in an alignment with the inner edge of the callus; columellar callus narrowly and flatly spreading, filling the narrow umbilicus except a conspicuous groove leading into it from the front.

Dimensions.—Length, 19; breadth, 14; diameter of aperture, 12·5; radius of aperture, 7·5.

Locality.—Eocene; "Crassatella-beds" at Table Cape, Tasmania!

Remarks.—In 1876 Tenison-Woods recorded a not uncommon Natica in the Table Cape beds as *N. ovata*, Hutton. I fail to find any such species among the various collections examined from that locality, and conclude that the subsequently described species, *N. vix-umbilicata*, was mistaken for it. Johnston ("Geol. Tasmania," 1888), however, retains both names.

N. vix-umbilicata is very much like *N. ovata*, Hutton. Compared with specimens of the latter from the Pareora River (Hutton's figure of this species, "Pliocene Moll. of New Zealand," in Macleay Memorial Volume, 1893, tab. 7, fig. 40, very imperfectly represents the shell obtained from the lower horizon), the present species is of much smaller size, slightly narrower, of fewer whorls, apex immersed, callosity not so extensive, and by the presence of an umbilical chink.

Among recent species, it has analogy with *N. conica*, but has not the elongate spire of that shell; but more so with *N. mammilla*, from which it differs by regularly convex body-whorl, proportionately wider.

5. Natica balteatella, *spec. nov.* Pl. vi., fig. 7.

Shell solid, narrow-oval-conic; whorls five, moderately convex, suture concealed by a thin adpressed extension from anterior whorl. Surface smooth, shining; ornamented by growth-lines (which are abruptly bent and develop into wrinkles on the antesutural band), coincident striæ and distant spiral striæ; a broadish band in front of the suture is conspicuously wavy-striated spirally, the spiral striæ being interrupted by the sharply-angled growth-folds, and by coincident striæ.

Aperture oval, outer lip acute; columella emitting a funicular ridge into the umbilicus, posterior callosity moderate.

Dimensions.—Length, 18·5; width, 7·5; diameter and radius of aperture, 8·5, 6·5; width of umbilicus, 2.

Localities.—Miocene, Hallett's Cove (very rare). Older Pliocene, Dry Creek-bore (very common).

This species has much resemblance to a young *N. conica*, but by its umbilicus is more akin to *N. subvarians*; the sculptured band in front of the umbilicus is a prominent distinctive feature.

6. Natica subvarians, *spec. nov.* Pl. vi., figs. 8, 10.

I apply this name to a shell, related to *N. varians*, but not connected with it by intermediate grades, from which it is distinguished by it elongate-oval outline and produced spire. From the recent *N. conica*, it is separable by its regularly-convex whorls, more open umbilicus with distinct funiculus. Fig. 6 represents a short spired variety.

Dimensions.—Length, 24; width, 17; length of aperture, 13.

Localities. — Eocene, Cheltenham (very rare)!; Miocene, Jemmy's Point and Cunningham, Gippsland!; Hallett's Cove, and Aldinga Bay!.

7. Natica varians, *spec nov.* Pl. vi., figs. 2, 9.

Shell solid, globulose-oval to pyriform-conic; spire very short, obtuse; whorls five, of rapid increase, suture concealed; last whorl very large and ventricose, usually, at least in the Muddy Creek specimens, slightly depressed on the back. Surface smooth and shining, ornamented with growth-lines and close reticulate striæ, the spiral striæ somewhat wavy. Umbilicus of moderate size, funiculus narrow, terminating on the columella in a moderate-sized callosity; columella thick, largely and thickly spreading posteriorly and over the hinder part of the umbilicus; the posterior callosity separated from the funicular callosity by a notch.

Dimensions.—(a) fig. 3. Length, 40; width, 32; length of aperrure, 31·5; width, 17. *(b)* fig. 4. Length, 41·5; width, 36; length of aperture, 36; width, 18·5.

Actual dimensions fail to convey the variability in shape presented by this species; but I have figured two somewhat extreme forms.

Localities.—Miocene (a common fossil); Jemmy's Point and Cunningham, Gippsland!; Muddy Creek!.

Remarks.—N. varians has resemblance to *N. Powisiana*, *N. effusa*, *N. intermereta*, *N. unimaculata*, and some other *Mammæ* of the North Pacific shores; the variation in shape and length of spire would permit of attachment to several of the above, but viewed in its composite character it appears to be distinguished by the fine reticulated ornament.

8. Natica Wintlei, *Tenison-Woods.*

Proc. Roy. Soc., Tasmania for 1875, t. 1, fig. 3, 1876.

Shell shining, stout, ventricosely subglobulose, umbilicated.

Whorls five and a-half to six, suture linear; spire obtuse, elongate; whorls rounded, slightly flatted posteriorly; one and a-half apical whorls depressed. Surface with fine growth-lines and coincident striæ; faintly and distantly spirally-lined, especially on the base; spirally striate on the depressed area in front of the suture. Aperture lunately-oval slightly oblique; outer lip acute not sinuate, basal lip incrassated. Umbilicus with a funicular rib; columella, posterior to the funicle, slightly dilated and confluent with the funicular termination, otherwise the umbilicus is narrow.

Dimensions of a moderately large specimen :—Length, 25·5; breadth, 21; vertical height of aperture, 18; radius of aperture, 10; diameter of umbilicus, 3. The proportion of the height to the breadth varies between 100 to 80 and 100 to 82; but a few examples from Table Cape have the relative values 100 and 84.

Localities.—Eocene; Crassatella-beds, Table Cape (common) !; basal beds of the Bird Rock-bluff, Spring Creek (abundant and large) !.

9. Natica Mooraboolensis, *spec. nov.* Pl. vi., fig. 5.

Shell globose, solid, smooth; whorls five; apex small, pointed; penultimate whorl flatly convex in posterior two-thirds, somewhat precipitously arching to the anterior suture, which is concealed; last whorl very ventricose, slantingly flattened behind. Aperture semilunate; columella stout, largely expanded behind the umbilicus, which is of moderate width, apparently simple and shallow.

Dimensions.—Length, 28; breadth, 27·5; width of umbilicus, 5.

Locality.—Eocene subcrystalline limestone on the Mooraboolriver, near Geelong (one example by Mr. G. Sweet).

This species is related to *N. substolida*, but has a more elevated spire, with the whorls flatly sloping behind. Among living shells it most nearly resembles *N. plumbea*, but is more globose, whorls flattened behind, shorter spire, and larger umbilicus.

10. Natica substolida, *spec. nov.* Pl. vi., fig. 3.

Shell solid, oval-globulose, subsphærical; spire conoid, very short, apex obtuse; whorls four narrow, thinly overlapping at the suture; body-whorl very large and convex. Surface smooth and shining, faintly lined and striated spirally, more conspicuously so on the base, crossed by slightly sigmoid incised lines and obscure threads, which at the suture give rise to a narrow wrinkled-band.

Aperture oblique, regularly semilunate; outer lip acute, slightly insinuated posteriorly; umbilicus simple; columella thick, largely expanding above the umbilicus to form a thick depressed callosity.

Dimensions.—Length, 23 ; breadth, 21 ; diameter of aperture, 19 ; radius of aperture, 12.

Localities.—Eocene : A common shell at Muddy Creek and River Murray Cliffs ! ; Cheltenham ! ; Camperdown !. Miocene : Kalima, Gippsland Lakes ! (rare and small).

Remarks.—This species is closely allied to *N. repanda*, Desh., but is distinguished by more convex body-whorl, more oblique aperture, and more obtuse and smaller spire. *N. substolida* connects the section *Naticina*, through *N. subinfundibulum*, with *Sigaretopsis.*

The specimens from the Murray-river Cliffs are smaller and have the umbilicus more concealed by the columella-callosity than those from Muddy Creek.

11. Natica arata, *spec. nov.* Pl. x., fig. 8.

Shell solid, globulose, subsphærical ; spire excessively short, apex obtuse ; whorls four and a-half, separated by a linear impressed suture ; apical whorls two and a-half, smooth, flatly convex ; the succeeding half turn with about twelve equi-distant transverse sulcations producing a crenulate margin at the posterior suture ; the surface of the remainder of the whorls linear-sulcate spirally ; at first the interspaces are slightly elevated, about equal in width to the sulci and slightly granulated by radial threads ; finally, on the body-whorl the interspaces are flat and broad, about 1 mm. wide on the medial part, and ·5 or less at the base and near the suture ; obscurely lined transversely and inconspicuously wrinkled at the suture. Aperture regularly semilunate ; outer lip bevelled to a thin edge ; columella straight, nearly vertical, rather thick, callously thinly expanding beyond the umbilicus to join with the outer lip ; umbilicus wide, deep, and simple.

Dimensions.—Length and width, 18 ; diameter and radius of aperture, 15 and 9·5 ; width of umbilicus, 3.

Locality.—Eocene calciferous sandstone, River Murray Cliffs (rare) ! ; Muddy Creek (one ex. !);

12. Natica limata, *spec. nov.* Pl. x., fig. 4.

Shell thin, fragile, globose ; spire short, broadly conic, obtuse ; apical whorls two and a-half, shining, smooth, depressedly convex ; the other whorls (two and a-half) regularly and moderately convex, of moderate increase, separated by a narrow, deeply-impressed suture.

Ornament of crowded, raised, wavy threads, sometimes linear at other times several times broader and flat, interrupted by transverse incised lines and striæ ; wrinkled at the suture, but only prominently so on the early spire-whorls.

Aperture regularly semilunate, nearly erect; outer lip thin; columella-margin thin, thinly and freely everted posteriorly, joined by a callous film to the outer lip. Umbilicus wide, simple, the ornament of the body-whorl entering the cavity.

Dimensions.—Length, 18·5; width, 18; diameter and radius of aperture, 14 and 9; width of umbilicus, 3.

Localities.—Eocene: Muddy Creek (rare)!; River Murray Cliffs (very rare)!; Mornington!; and Spring Creek (very rare)!.

13. Natica polita, *Tenison-Woods.*

Proc. Roy. Soc. Tasm., for 1875, p. 23, t. 1, f. 4 (1846) (fig. not good).

Shell shining, moderately stout, ventricosely sub-globulose, umbilicated. Whorls four and a-half, separated usually by a profundly canaliculate suture. Aperture semilunate, slightly oblique; outer lip obtuse, not at all arched. Surface smooth or transversely finely striate, and faintly spirally lined.

Dimensions.—The shell varies in the height of the spire, and much in size; an averaged sized specimen measures, long. 8·75, lat. 7·5 to 7·25, umbilicus 1. Some extremely low-spired forms, with which is invariably associated an ill-defined channelled suture and wider umbilicus (about 2 mm.), give the following measures: —long. 8·5, lat. 9·5 (River Murray); 13·5 by 13·5 (Table Cape); this variety which I will name *inflata* approaches in shape to *N. Hamiltonensis.*

Localities.—*Forma typica*, Eocene: Table Cape!; Muddy Creek, also as derived in the upper beds (Miocene)!; Mornington!; Cheltenham!; Gellibrand River!; Belmont!; River Murray Cliffs!; Shelford!. Miocene: Jemmy's Point (a single dwarf ex.!), *Forma inflata;* Table Cape!; River Murray Cliffs!; Fyansford!; Bird-rock Bluff (chiefly intermediate between *forma typica* and *var. inflata*)!; Bellarine Peninsula!.

Remarks.—Tenison-Woods (Proc. Roy. Soc. Tasm. for 1877, p. 32, 1878) records *N. polita*, also, as a recent shell on the Tasmanian Coast. Johnston (id. for 1884, p. 221, 1885) adduces the following distinctions for the separation of the living analogue under the name of *N. Beddomei*:—

"In the living form the spire is more depressed, and the whorls increase more rapidly in size. In the fossil form the nucleus is invariably smaller than in the living representative, and the number of whorls in mature specimens is four and a-half. In the living mature form the number of whorls is invariably three and a-half. The aperture in both does not present any marked difference, if we except the fact that, in the fossil state, the inner margin is almost vertical. In the living form, the same feature is more decidedly angled relative to a

central line drawn through the nucleus. If anything the fossil shell is larger and more solid, although it must be stated, that, if an immature fossil shell be selected for comparison with only the same number of whorls developed as in the mature living form, the latter seems to be the broader of the two."

14. Natica perspectiva, *spec. nov.* Pl. x., fig. 7.

Shell thin, globular, spire short, conic, somewhat obtuse; whorls four and a-half, narrow, ventricose, slightly depressed in front of the suture; suture linear impressed. Surface smooth, shining, ornamented with striæ of growth; obsoletely wavy-striated spirally, more conspicuous on base of body-whorl. Aperture regularly semilunate, erect; outer lip thin; columella-margin thin, thinly and freely everted posteriorly, joined by a callous film to the outer lip. Umbilicus broad, profund, simple, defined by an obtuse keel confluent with the basal angle of the aperture which is there thickened; the columella-wall of the umbilicus is somewhat concave, vertically and transversely lined.

Dimensions.—Length, 17; width, 16·5; base and radius of aperture, 12·5 and 8; width on umbilicus, 4.

Localities.—Eocene: Muddy Creek (common)!; Mornington!; Gellibrand River!; Camperdown!; Cheltenham!. Miocene: Gippsland (one ex. !).

Affinities.—*N. perspectiva* is related to *N. limata*, but it has more convex whorls, body-whorl much larger, larger umbilicus defined by a keel; from *N. polita* it is separable by its globose form, narrow suture, and wide umbilicus. Among exotic species it has a near ally in *N. semilunata*, Lea, of the Alabama-Eocene from which it differs chiefly in its impressed suture.

15. Natica Aldingensis, *spec. nov.* Pl. x., fig. 5.

Shell moderately solid, somewhat intermediate in shape between *N. limata* and *N. perspectiva*, but with a shorter spire, and though the suture is open yet it is not distinctly channelled as in those species; the umbilicus is like that of *limata*, but is much narrower.

Surface ornamented with striæ and lines of growth, the latter raised into slight wrinkles at the suture, and obsolete spiral lines and striæ.

From *N. semilunata* it is distinguished by its more ventricose spire-whorls and small umbilicus.

Dimensions.—Length, 19; width, 18; diameter and radius of aperture 19 and 9·5; width of umbilicus, 2·5.

Localities.—Eocene: Aldinga Cliffs (common); and Adelaide-bore.

16. Natica subinfundibulum, *spec. nov.* Pl. x., fig. 11 ; pl. vi., fig. 6.

Shell usually rather thin, depressed, auriform ; spire very short, obtuse ; whorls three, suture concealed. Surface with crowded, curved, transverse lines, which coalesce at the suture in slight folds. Spiral lines distant and faint, two or three less indistinct at the suture. Aperture obliquely lunate, outer and basal margins acute ; columella nearly vertical, the posterior-half somewhat thickened, slightly reflected, and joined to the outer lip. Umbilicus very large and perspective ; columella-wall of the umbilicus slightly concave, or with an ill-defined medial ridge, distantly spirally-lined and axially closely-striate. The edge of the umbilical depression either slopes gradually inwards or is abruptly defined.

Dimensions.—Length and width, 13 ; height, 8 ; basal length of aperture, 12 ; width of umbilicus, 4·5.

Localities.—Eocene : Muddy Creek!; Mornington! Gellibrand River ! ; Fyansford ! ; Cheltenham ! ; Murray-river Cliffs !. Miocene : Muddy Creek ! ; Gippsland !.

Affinities.—This third species of the section *Sigaretopsis*, established by Cossmann (Soc. Roy. Malac. Belgique, vol. XXIII., p. 168, 1888) differs, by comparison of actual specimens, from *N. infundibulum*, Wat., by narrower and more convex body-whorl, and by more obtuse spire. Deshayes' figures of *N. Woodi* represent a more globulose shell, with a much-less open umbilicus.

I would place in this section *Natica umbilicata*, Quoy and Gaimard, recent on the coast of Southern Australia, which is referred to *Mamilla* by Tryon. Our fossil species is more compressed and vaulted, and has a much wider umbilicus.

Varieties.—Var. crassa is distinguished simply by its thick test and usually larger size, attaining to 20 mm. in length and width. It occurs at Muddy Creek in the lower and upper beds ; sometimes as a derived fossil, though rarely *in situ*, in the latter ; also at Cheltenham, where the largest specimens occur. Var. rhysa, in which the spiral ornament consists of close-set wavy threads. A single example from the River Murray Cliffs. But some specimens of *var. crassa* from Muddy Creek exhibit this ornamentation in a less conspicuous way, graduating to the typical form in which it is obsolete.

Genus Ampullina.

Section Euspira.

Ampullina effusa, *spec. nov.* Pl. x., figs. 2, 2*a*.

Shell acuminately globose, elongate ; test thin and fragile ; whorls eight and a-half, convex, slightly flattened in front of suture ; suture simple, linearly impressed ; spire elongate,

regularly conical, whorls of slow increase, apex erect with the tip immersed. Surface ornamented by crowded spiral striæ, broken up into narrow (·5–·75 mm.) transverse bands by slightly curved incised lines.

Last whorl globulose, large, a little higher than the length of the spire. Aperture somewhat oblique, semilunate; outer and basal margins effusively dilated; outer lip slightly ascending, thin; columella thinly everted; umbilicus simple, rather narrow, partly concealed by the everted columella border.

Dimensions.—Length, 35; width, 24; height of aperture, 21; width of aperture, 13, width of umbilicus, 2 *(vix)*.

Locality.—Eocene: Glauconitic clayey sands, Adelaide-bore (many examples).

Remarks.—This interesting species is certainly congeneric with *Natica acuminata*, Lamk., and *N. Levesquei*, D'Orb., transferred by Cossmann to the section *Euspira* of the genus *Ampullina*. It agrees with them in the elevated and canaliculate spire, but is readily distinguished by its regular spire (not subulate), effusively dilated aperture, and elegant sculpture; from *A. acuminata*, it is further removed by being umbilicated, but resembles *A. Levesquei* in its simple umbilicus.

Genus Sigaretus.

Sigaretus microstira, *spec. nov.* Pl. vii., fig. 10.

Shell depressed, narrow oblong-oval; spire short, not at all prominent; suture concealed; columella slightly thickened and narrowly reflected, forming an open umbilical fissure. The ornamentation consists of conspicuous undulations and coincident striæ, and of very slender and distant spiral threads and coincident striæ; the spiral ornament is hardly visible by the unaided eye, and is confined to the median and posterior portions of the body-whorl; the spiral threads are closer together (the interspaces only two or three times wider) and are more prominent posteriorly, which are there conspicuously reticulated by the transverse striæ.

Dimensions.—Length, 18; breadth, 13; height, 7.

Locality.—Eocene: Bird-rock Bluff (two examples).

Affinities.—This new species has a resemblance in outline and elevation of spire to *S. Cuvierianus*, Recluz. The umbilical fissure is open, not covered by a reflection of the columella, as is usual among living congeners, in this particular *S. microstira* is related to *C. clathratus* and some other species in the Eocene of Europe, from all of which it differs by its depressed and elongate shape.

Heligmope, *gen. nov.*

Etymology—*heligmos*, a sinuosity; *ope*, an aperture.

Shell oval-globulose, thin, not pearly, imperforate; aperture large, oblique; columella thin, truncated anteriorly; basal margin of aperture *insinuated.*

The genus may be described as an imperforate *Eunaticina*, or a *Sigaretus*, with a sinuated front margin, and stands in relation to it as *Protoma* does to *Turritella.* The non-perlaceous test removes it from the neighbourhood of *Stomatella.*

Heligmope Dennanti, *spec. nov.* Pl. vii., figs. 5-5*a*.

Shell rather thin, oval, convex [or somewhat depressed-orbicular]; spire moderately prominent [or depressed]. Whorls four and a-half, suture more or less concealed by the adpressed reflection from the anterior whorl. Ornament of slightly elevated, rounded, spiral ribs, about ten on body-whorl [sometimes the spiral ribs are almost obsolete], narrower than the flatly concave furrows, crossed by close-set lamelliform striæ, which become wider apart and more distinctly lamellar with the decreasing revolution of the spire.

Aperture oblique, oblong-oval [or semicircular]; outer lip acute, crenulated by the spiral ribs; columella cylindric, thinly reflected posteriorly and adherent over the umbilical area; the lamellæ of the back intersect the sinus-band.

The words included in parentheses in the foregoing diagnosis refer to the majority of the specimens obtained from Hallett's Cove, and thus markedly differ from the figured specimens which I select as types and with which all the Muddy Creek specimens agree; though from the former locality I have a fairly typical specimen, otherwise I should have been disposed to regard the depressed form as a distinct species.

Dimensions.—Length, 32; width, 27·5; height and width of aperture, 25 and 16.

Localities.—Miocene: Muddy Creek, Victoria, and Hallett's Cove, St. Vincent Gulf.

This species was first brought to my notice by Mr. J. Dennant, who kindly forwarded me the figured examples, after whom it is named.

FAMILY HIPPONYCIDÆ.

Genus Hipponyx.

Hipponyx antiquatus, *Lin.*

H. foliacea, Quoy and Gaimard, Voy. Astrolabe, vol. III., p. 439, pl. 72, figs. 41-45.

A *Capulus*-like shell with concentric laminations and radial threads.

Habitat.—Eocene and Miocene: Muddy Creek! Recent: Australia, Polynesia, &c.

Hipponyx australis, *Lamarck.*

H. australis, Quoy and Gaimard, op. cit., p. 434, pl. 72, figs. 25-34.

Differs from *H. antiquatus* by its broadish flat radiating ribs ribs separated by narrow interstices.

Habitat.—Miocene: Hallett's Cove, St. Vincent Gulf!; and Muddy Creek! Newer Pliocene: Limestone Creek, Dartmoor *(J. Dennant!)*. Recent: Australia, New Zealand, &c.

FAMILY CALYPTRÆIDÆ.

Genus Crepidula.

SYNOPSIS OF SPECIES.

Apex terminal.	1. *unguiformis.*
Apex submarginal.	2. *dubitabilis.*
Apex posterior, but distant, hooked.	3. *Hainsworthi.*

1. Crepidula unguiformis, *Lamarck.*

Id., Reeve, Conch. Icon., fig. 1.

Forma typica.—Upper surface flat or concave.

Habitat.—Miocene, Gippsland!. Fossil specimens have been compared with living examples from east coast of N. America and from Southern Australia. [Also Pliocene, Wanganui, &c., New Zealand. Recent, almost cosmopolitan.]

Forma convexa.—(Syn. *C. immersa*, Angas). Upper surface convex.

Habitat.—Eocene: Muddy Creek!; Cheltenham!; Table Cape!. Recent: South Australia, &c.

Forma inflata.—(Syn. *C. monoxyla*, Lesson). Upper surface very convex; resembles *C. fornicata* without radial ridges.

Habitat.—Eocene: Muddy Creek!. Miocene: Muddy Creek (specimens faintly ridged)!. Newer Pliocene: Limestone Creek *(J. Dennant!)*. Recent: New Zealand, and also in Pliocene strata at Wanganui, Petane, &c.

2. Crepidula dubitabilis, *spec. nov.* Pl. ix., fig. 5.

Shell like *C. monoxyla*, but the small spiral apex is narrowly separated from the margin. It, however, varies from convexedly depressed to moderately inflated.

Dimensions of a medium specimen:—Length, 25; width, 16; height, 8.

Localities.—Eocene: River Murray Cliffs!; Mornington!. Miocene: Gippsland lakes!

3. Crepidula Hainsworthi, *Johnston.*

Ref.—Proc. Roy. Soc. Tasmania for 1884, p. 333, figs. *a-c*, 1885; *id.*, Geol. Tasmania, t. 32, f. 13, 1888.

Basal outline oval, narrowly and abruptly arched laterally,

and gently rounded longitudinally; surface with fine growth-lines; beak hooked, posterior, projecting beyond the posterior margin.

Dimensions.—Length, 14; breadth, 8; height, 5·5 mm.

Locality.—Eocene: Table Cape *(J. M. Johnston)*.

Genus Calytraea.

synopsis of species.

Axis imperforate (Calyptraea, *s.s.*).
  Shell depressed, apex subcentral.
    Concentrically corrugated, interruptedly convex. 1. *corrugata.*
    Concentrically lamellose-striate, regularly convex. 2. *placuna.*
  Spire elevated, apex lateral or subcentral.
    Whorls ventricose, posteriorly flattened. 3. *subtabulata.*
    Whorls regularly convex.
      Spire narrow-conic; finely lamellate-striate concentrically; spirally-lined. 4. *undulata.*
      Spire broad-conic; concentrically lamellose. 5. *crassa.*
Axis umbilicate (Calyptropsis) depressedly convex, apex very excentric.
  Body-whorl ventricose; base subcircular.
    Concentrically lined, radially lined and striated. 6. *arachnoideus.*
  Body-whorl flatly sloping posteriorly.
    Base subcircular, slender radial and concentric threads. 7. *turbinata.*
    Base oval, radially costated, finely lamellose, striated concentrically, body-whorl much depressed. 8. *umbilicata.*

1. Calyptraea corrugata, *spec. nov.* Pl. vii., fig. 9.

Shell depressed, orbicular in basal outline, sub-pellucid; body-whorl more or less ventricose around the suture, surface irregularly concentrically ridged; edge of septum slightly arched.

Similar to *C. pellucida*, Reeve, with specimens of which I have compared it; but differs by interruptedly-convex whorls and strong growth-folds.

Dimensions.—Basal diameters, 12 and 11; height, 3·5.

Localities.—Miocene: Muddy Creek and at Nor'-west Bend, River Murray.

2. Calyptraea placuna, *spec. nov.* Pl. vii., fig. 4.

Shell depressed, thin, fragile, orbicular in basal outline; body-whorl regularly convex, anterior surface slenderly lamellate concentrically, becoming posteriorly striate.

Dimensions.—Basal diameters, 15 and 16 ; height, 4·25.
Localities.—Eocene : Aldinga Cliffs and Adelaide-bore.

3. Calyptraea subtabulata, *spec. nov.* Pl. vii., fig. 1.

Syn.—*Trochita calyptraeformis*, R. M. Johnston, Proc. Roy. Soc., Tasmania for 1876, p. 86 (1877) ; id., "Geol. Tasm.," t. 29, f. 14.

Shell moderately stout, orbicular in basal outline, spire elevated, subcentral ; apex minute, slightly exsert ; body-whorl conspicuously flattened in front of suture, surface with subimbricating growth-folds and spiral coarse striæ ; septum with a nearly straight edge.

The shell varies much in height, and the higher the spire the more tabulated are the whorls, the figured specimen represents the most commonly-occurring form.

Dimensions.—Basal diameters, 29·5 and 26·5 ; height, 12.

Locality.—Eocene: Table Cape, Tasmania, *R. M. Johnston, &c.* !

This abundant fossil at Table Cape was referred by Johnston to the living Australian shell, *Trochus calyptraeformis*, Lamarck (=*Calyptraea tomentosa*, Quoy and G.), to which, however, it has only a distant resemblance.

Pileopsis navicelloides, R. M. Johnston, Poc. Roy. Soc., Tasmania, for 1879, p. 39 (1880), is probably a *Calyptraea*, and possibly a very young state of *C. subtabulata.* The original diagnosis reads as follows :—Shell minute, depressed, subrotund ; nucleus scarcely lax, exserted, of about one and a half smooth turns, submarginal ; disk with rough uneven surface, concentrically irregularly striate ; aperture ovate, closed at posterior margin by a *spiral concave* shelf, terminating on either side by a downward reflexed curve in the muscular impressions, which are well-defined. Dia. mag., 3·5 ; min., 3 ; alt., 1. Table Cape (one specimen).

4. Calyptraea undulata, *spec. nov.* Pl. vii., fig. 3.

Shell thin, orbicular in basal outline ; spire elevated, subcentral, of rather rapidly increasing, steep-sloping whorls ; apex minute, oblique, circinately-coiled ; body-whorl regularly convex ; surface concentrically ridged and coincidently striated, faintly spirally-lined ; septum with a nearly straight edge.

Dimensions.—Major and minor diameters, 16·5 and 15·5 ; height, 8.

Localities.—Eocene : Muddy Creek ; River Murray Cliffs.

Differs from *C. subtabulata* by regular convex whorls and more excentric spire.

5. Calyptraea crassa, *spec. nov.* Pl. vii., figs. 2, 7.

Shell rather stout, orbicular in basal outline ; spire elevated, subcentral of rapidly increasing, moderately convex whorls ;

apex small, oblique, circinately coiled; body-whorl regularly flatly convex, concentrically lamellose-ridged; septum with a concave edge.

Dimensions.—Diameters, 27 and 25; height, 11.

Localities.—Miocene: Gippsland Lakes (common)!; Hallett's Cove!.

Differs from *C. undulata*, by its less excentric apex and less ventricose whorls.

SUBGENUS CALYPTROPIS, *Tate.*

Ref.—Proc. Roy. Soc., N.S. Wales, vol. XXVII., p. 181, 1893.

"Shell like *Calptraea*, but umbilicated, and with a columella-insinuosity at the umbilical border.

6. Calyptropsis arachnoideus, *spec. nov.* Pl. vii., fig. 9.

Shell thin, orbicular in basal outline; spire depressed, apex submarginal, of rapidly increasing, ventricose whorls; surface ornamented with acute raised concentric threads and distant similar spiral threads; the interspaces with close, raised striæ; septum slightly ecurved medially, slightly concave, faintly radiately ridged.

Dimensions.—Diameters, 12·5 and 10·5; height, 4·25.

Localities.—Eocene: Aldinga Cliffs and Adelaide-bore (very rare.

7. Calyptropsis turbinata, *Ten.-Woods.*

Trochita turbinata, Ten.-Woods, Proc. Lin. Soc., N.S. Wales, vol. III., p. 238, pl. 21, fig. 1, 1879.

Shell thin, suborbicular in basal outline, turbinately depressed; whorls two and a-half, rapidly increasing, somewhat flattened posteriorly, apex exsert; surface slightly corrugated concentrically, and coincidently finely lined; spirally distantly lined, faintly ridged on posterior area of body-whorl; septum deeply sunk, radiately sulcate; umbilicus narrow.

Dimensions.—Diameters, 11 and 10; height, 4·5.

Localities.—Eocene: Muddy Creek *(Tenison-Woods!)*; Bird-rock Bluff, near Geelong!.

8. Calyptropsis umbilicata, *Johnston.*

Crepidula umbilicata, R. M. Johnston, Proc. Roy. Soc. Tasmania for 1884, p. 232 (two figs.), 1885; id., "Geol. Tasmania, t. 32, fig. 10, 1888.

Shell rather thin, oval in basal outline; body-whorl depressed, flatly convex, more rapidly sloping from the periphery to the margins; apex posterior, oblique, submarginal, slightly elevated; whorls two and a-half of very rapid increase; surface somewhat rugose with a few distant spiral ridges crossed by lamellæ of

growth, and coincident fine striæ. Septum flat or slightly concave, its margin nearly straight; umbilicus moderately wide profund.

Dimensions.—Diameters, 17 and 13; height, 5.

Locality.—Table Cape *(R. M. Johnston!)*.

Genus Capulus.

Syn.—*Pileopsis*, Lamk.

SPECIES EXCLUDED.

Pileopsis navicelloides, Johnston, is transferred to *Calyptraea*.

1. Capulus circinatus, *spec. nov.* Pl. vii., fig. 8.

Shell cornucopia-shaped with a spiral recurved slightly excentric apex, base roundly oval, sides slightly compressed; whorls two and a-half, the anterior one detached; surface with fine radial threads crossed by slender folds and fine threads which are arched medially.

Dimensions.—Diameters, 2·5 and 2; height, 3·25.

Locality.—Eocene: Adelaide-bore (one ex.).

2. Capulus Danieli, *Crosse.*

Syn.—*C subrufus*, Sowerby, *non* Lamk.

The fossils, which I refer to the living species of this name, have been compared with specimens of a species usually known in Southern Australian waters as *Capulus subrufus*, Sowb., the larger forms of which have received Crosse's name, as the result of comparison of authenticated examples from New Caledonia.

Tyron places the species in the genus *Hipponyx*, but as no shelly base is formed, I retain it in *Capulus*.

The shell has somewhat compressed sides, an irregular orbicular base, but it is variable in these particulars, as largely dependent on the outline of the surface of attachment; the apex is posterior usually turned to the left, and either prolonged or subspirally hooked.

The fossil specimens exhibit equal variation of shape and form of apex, as do the recent ones, but seem to be devoid of fine radial ridges, and thus present the usual aspect of beach-shells.

Localities.—Eocene: Muddy Creek!. Miocene: Aldinga Cliffs and Muddy Creek!.

FAMILY TURRITELLIDÆ.

Genus Turritella.

From the great variability in form and sculpture of the majority of our fossil-species of this genus, one is tempted to conclude that no satisfactory position can be taken up anywhere

between the extremes regarding the whole genus as an enormous protean species, or describing nearly every colony as a separate species. Here characters can be seen varying in all directions, and in almost all degrees, though some variations seem to be fixed, whilst others remain indefinite. This is very perplexing in the definition of species, though to the student of evolution this difficulty will be full of interest.

Specimens presenting a sinus in the outer lip are too rare (and so far only observed in two species) to use this feature in the arrangement of the species, but the form of curvature, which the incremental lines present, may prove of importance; the exigencies of publication have, however, prevented me testing fully the classificatory value of this character.

The internal septation, which is exhibited by two of our species (*T. septifraga*, in which it is invariable and frequent, and *T. tristira*, observed in one instance), is a feature hitherto unrecorded in the genus.

SYNOPSIS OF SPECIES.

Whorls smooth, or not distinctly lirate, subimbricating.
  Shell very elongate, posterior whorls medially carinate. 1. *septifraga.*
  Shell under 15 mm., anterior whorls ridged posteriorly. 2. *pagodula.*
Whorls carinate and lirate.
  Keels granulose.
    Keels three, median granulose. 3. *Aldingae.*
    Keels three, anterior and median granulose. 4. *Warburtoni.*
    Keels three, middle one granulose. 5. *Sturtii.*
    Keels four to five, all granulose. 6. *gemmulata.*
  Keels not granulose.
    Keels three, equal. 7. *tristira.*
    Keel one, very prominent. 8. *conspicabilis.*
    Keels two, whorls imbricate. 9. *acricula.*
Whorls lirate.
  Liræ numerous, squamose, whorls medially concave. 10. *Murrayana.*
  Liræ under 20, more or less unequal, whorls flat or imbricate; shell slender. 9. *acricula.*
  Liræ five or less, whorls flat or slightly convex. 11. *platyspira.*

SPECIES EXCLUDED.

Turritella transenna, Tenison-Woods, Proc. Lin. Soc., vol. III., p. 234, an Eocene-fossil at Muddy Creek, is transferred to *Mathilda.*

1. Turritella septifraga, *spec. nov.* Pl. viii., fig. 5.

Shell narrowly lanceolate-turreted ; whorls 18, apex unknown anterior whorls concave, sloping to the sharp angulation at (and somewhat imbricating over) the anterior suture ; posterior whorls flat or very slightly concave, slightly keeled in the anterior-fourth, suture linear.

Surface ornamented with deeply sinuous, crowded, fine striæ of growth ; the anterior keel of the anterior whorls two to three lined, faintly and distantly lined on the concave area.

Aperture subquadrangular, outer lip with a broad, moderately-deep sinus (that is judging from growth-lines).

The interior is septated at every two or three whorls throughout the posterior-half of the length of the shell; and the facility with which the shell breaks at these junctions has suggested the specific name.

Dimensions.—Length (incomplete), 100 ; width, 17.

Locality.—Eocene : Bird-rock Bluff, Geelong ! .

The absence of conspicuous spiral ornament removes this species from somewhat similar congeners, such as *T. Cumingii*, Reeve, *T. imbricataria*, Lk., &c.

2. Turritella pagodula, *spec. nov.* Pl. viii., fig. 10.

Shell small, acuminately turreted ; whorls thirteen (incl. embryo), with a prominent roundly-angled ridge over the anterior suture, with or without a less conspicuous ridge at the posterior suture ; apical whorls two, very small, inflated ; posterior spire-whorls keeled over the suture. Surface smooth, shining, closely insinuate-striate transversely and faintly spirally-lined in the concave area between the anterior and posterior ridges. Periphery of body-whorl subtended by a subordinate keel ; base with about ten concentric threads crossed by radial striæ. Aperture subquadrangular ; outer lip with a semicircular insinuation above the anterior keel.

Dimensions.—Length, 12·5 ; width, 4·25.

Locality.—Miocene : Gippsland Lakes (not uncommon !).

This species has some affinity with the recent *T. exoleta*, Linn., but its small size and obsolete posterior ridge distinguish it ; also with *T. granulifera*, Tenison-Woods, which is, however, conspicuously different by its granulated keels ; and more so with *T. terebellata*, Tate, *m.s.*, Newer Pliocene, Limestone Creek, W. Victoria, which has the anterior keel nodulose.

3. Turritella Aldingæ, *Tate.* Pl. viii., fig. 1.

Reference.—Trans. Roy. Soc. S. Aust., vol. V., p. 45, 1882.

Shell acutely pryamidal, a little more than three times as long as broad, whorls about twenty in a length of 33 mm., sub-

quadrate or flattish with three prominent ribs, moderately impressed suture, the medial ones usually granulose. Base flattened, ornamented with many unequal-sized spiral threads, which are crossed by very fine radial striæ. Aperture subquadrate, margins united by a somewhat thick callus, which extends over much of the base; columella arched, regularly curving to the rounded basal lip; outer lip somewhat flatly compressed, deeply and broadly sinuated.

The ornament on the whorls varies much in different specimens, as well as in different parts of the same shell. The medium prominent rib is generally granulose; the posterior rib is bisulcated, or not infrequently replaced by two or three strong threads; the interspaces between the ribs and adjacent to the sutures are ornamented with a few spiral threads crossed by curved lines of growth. On the anterior whorls of large examples there are about eight unequalled-sized spiral ribs—the posterior rib on the earlier whorls has developed into three prominent ribs, and one or more of the intermediate threads have become conspicuous, whilst the granulations of the medium rib have disappeared.

The posterior six whorls or so have occasionally all the ribs granulose, thus resembling *T. Sturtii;* but at this early stage *T. Aldingæ* does not possess intermediate ribs.

Dimensions.—Length, 36; breadth, 10·5; depth and width of sinus, 3.

Localities.—Eocene: Argillaceous limestone and associated clays at Blanche Point, Aldinga Bay (very abundant), and Adelaide-bore!; also in the "Turritella limestone" about Ardrossan, Yorke Peninsula *(J. G. O. Tepper!).*

In outline, general shape of whorls, and deep sinus, this fossil species has an analogue in *T. runcinata*, Watson, "Challenger" Gasteropoda, p. 475, t. 30, fig. 3; compared with actual specimens of which, the fossil is conspicuously distinguished by curved columella (not straight in the axis, and effusively dilated at the front), and tricarinate whorls.

4. Turritella Warburtoni, *Ten.-Woods.* Pl. viii., fig. 2.

Shell small, narrowly pyramidal; whorls 15, in a length of 9·5 mm.; apex of two and a-half smooth turns, the tip subglobulose, the next turn narrow and convex; ordinary whorls concave, separated by a narrow deeply impressed suture, roundly elevated at the posterior suture, more angulated and elevated at the anterior suture; posterior to which and near to is a more acute but less stout keel; the two anterior ribs more or less granulose; each of the interspaces between the keels with two or three fine threads of varying size. Growth-lines hardly discernible, slightly

arched. Base flat, separated from peripheral keel by a deep groove; ornamented with about eight spiral ridges.

Aperture quadrate; columella thinly reflected.

Dimensions.—Length, 14; breadth, 4.

Locality.—Eocene: Table Cape (*Ten.-Woods*, common !).

Has a resemblance to *T. pagodula*, Tate, but is a narrower shell, and differs in the details of the ornamentation; from *T. granulifera*, T.-Wds., to which it bears some resemblance by its smooth posterior keel and its prominent anterior one.

5. Turritella Sturtii, *Tenison-Woods.* Pl. viii., fig. 6.

Shell small, acutely pyramidal; whorls fifteen in a length of 12 mm., apex of three small smooth rounded turns; ordinary whorls constricted at the suture, spirally ribbed; prominent ribs three, equidistant, of which the median and anterior ones are granulose, the posterior one often double, each interspace with about two fine spiral threads; growth-lines deeply arched. Base flattened, angulated at the margin, with seven or eight equal-sized spiral threads, crossed by numerous very fine striæ. Aperture subquadrate; outer-lip thin; columella thinly reflected behind and over the base.

Dimensions.—Length, 22; breadth, 5·25.

Locality.—Eocene: Abundant in the "Turritella beds," Table Cape (*Tenison-Woods !*).

6. Turritella gemmulata, *spec. nov.* Pl. viii., fig. 11.

Shell minute, narrow lanceolate-turreted; apex of one and a-half turns, the tip globulose, the next turn convex, narrow; whorls nine (excl. embryo), flatly concave, but separated by a broad, deeply impressed suture; ornamented by beaded ribs, decreasing in number from front backwards from five or six to three, the next but one to the anterior suture usually with the largest granules; the last three spire-whorls bi- or uni-carinate. Periphery of body-whorl rounded, base with about five encircling threads; aperture rotund, columella thinly reflected.

Dimensions.—Length, 6·5; width, 1·75.

Localities.—Eocene: Muddy Creek (not uncommon !); Bird-rock Bluff, Spring Creek (rare !).

7. Turritella tristira, *Tate.* Pl. viii., fig. 8; Pl. x., fig. 3.

Ref.—Proc. Roy. Soc., Tasmania, for 1884, p. 227 (1885).

Shell acuminately turreted; apical angle about 15°; whorls seventeen, anterior and medial whorls slightly convex, suture linear; apex globulose of one and a half whorls, the tip immersed, the first four or five spire-whorls flatly convex, the next three or four medially concave. Surface ornamented with three conspicuous, acute, spiral ribs, the interspaces with closely and

finely spiral striæ and inconspicuous transverse striæ; the sulci on each side of the central rib are of equal breadth, but the anterior rib is separated from the suture by a distance less than that which intervenes between it and central rib, whilst the posterior rib is separated from its corresponding suture by a distance greater than the breadth of the medial sulcus. Last whorl with four keels, truncately angular at the periphery; base spirally flatly ribbed and interstriated. Aperture quadrate; outer lip imperfect; the striæ of growth deeply roundly arched between the anterior and posterior keels.

Dimensions.—Length, 46; breadth, 12.

Locality.—Eocene: Table Cape (*R. M. Johnston*, one example!); Cheltenham (not uncommon!); Camperdown!; Belmont!; (?) well-sinking, Murray Desert!. Miocene: Gippsland Lakes (very abundant!).

This species is distinct from the few living species, which are conspicuously three-ribbed, by shape, ornament, and the unsymmetrical position of the revolving keels. *T. tricincta*, Hutton, Pliocene and Miocene in New Zealand, has three unequal keels and the whorls more convex.

8. Turritella conspicabilis, *spec. nov.* Pl. viii., fig. 7.

Shell similar to *T. tristira*, but differs in its ornamentation. The spire is acuminately attenuated; the embryonic whorls are succeeded by two or three convex whorls, then follow three or four, which are convex posteriorly, but abruptly declining to the anterior suture; the anterior keel becomes stronger, and on the posterior area threads appear, increasing in number with the revolution of the spire. Anterior whorls have a high rounded rib, situated in the anterior one-third, separated by a wide sulcus from the posterior one-half, which is ornamented by six to ten threads alternately large and small; the anterior-half, including the keel, is spirally striate.

Locality.—Eocene: Spring Creek!. Miocene: Gippsland Lakes!.

Though associated with *T. tristira* at the latter locality, and not with it elsewhere, yet as there are no decided intermediate stages, I have somewhat reluctantly considered it a distinct species. A varietal form (pl. ix., fig. 6), if not a distinct species, occurs abundantly at Spring Creek, which differs by less prominent keel. It makes some approach to that variety of *T. runcinata*, in which the front keel is conspicuously elevated, but the whorls are more quadrate, the keel truncated on the edge; whilst the spiral striæ are fewer and not wavy-interrupted.

9. Turritella acricula, *spec. nov.* Pl. viii., fig. 4; pl. ix., figs. 4, 7, 8.

Shell very acutely lanceolate-turreted; whorls twenty, apex mammillary of two narrow convex turns, early posterior whorls

smooth and sharply carinated in the middle, anterior whorls flatly convex to the sharp or blunt angulation at (and somewhat imbricating over) the anterior suture, sometimes the anterior angulation is obsolete. Surface ornamented with spiral threads (about fifteen or more); of these three to five are sharply elevated into slender keels, the medial one of which is usually the most prominent, the interspaces being then finely lirate; rarely are the threads approximately of equal strength. The transverse ornament consists of medially-arched growth-lines, close or rather distant, in the latter case producing the appearance of punctures, sometimes the lines of growth are raised into lamellæ. Periphery of body-whorl acutely angulated, base concentrically ribbed and radially striated. Aperture subquadrangular, slightly oblique, columella nearly straight, thinly reflected and spreading behind; outer lip not seen perfect.

Dimensions.—Length, 38; breadth, 6·25

Localities.—Eocene: River Murray Cliffs (very abundant!); Sc. Mornington!; Muddy Creek!; Cheltenham!; Corio Bay!; Camperdown!; Gellibrand River!; Spring Creek!; Table Cape. Miocene: Gippsland Lakes!; Aldinga Cliffs (imperfectly determinate!).

This species varies in the form of the whorls and the development of the liræ; a variety occurring at Gellibrand River and Muddy Creek has slightly, though regularly, convex whorls, which are finely lirate (pl. ix., fig. 4); a similar form occurs at Table Cape (pl. iv., fig. 12), but is much stouter, slightly angulated towards the suture, and strongly lirate.

It is separable with difficulty from *T. acuta*, Ten.-Woods, Proc. Roy. Soc. Tasmania, p. 143, 1876, a recent species in S. Australia and Tasmania; they have similar apices, and exhibit the same variation in the extent of imbrication of the whorls; but *T. acricula* is relatively narrower, and has more liræ, whilst in *T. acuta* the liræ never assume the character of keels.

10. Turritella Murrayana, *Tate.* Pl. viii., fig. 3.

Torcula Murrayana, Tate, Proc. Roy. Soc. Tasm., for 1884, p. 227 (1885).

Shell pyramidally turreted, apical angle about 15°. Whorls twelve to fourteen, flattish, medially depressed, and acutely elevated at about the anterior-fourth; suture thread-like or somewhat grooved; apical whorls two, very small, globulose; first spire-whorls rapidly enlarging 1-3 carinate. Surface ornamented by about 24 spiral threads, with or without smaller intermediary ones, crossed by close-set striæ, the latter on the anterior whorls thinly squamose. Last whorl bluntly truncated on the periphery; base with spiral threads and transverse striæ as on the upper part of the whorl.

Aperture quadrately oval, continuous; outer lip with a deepish subtriangular median sinus.

The sectional outline of the whorls varies from flat or slightly concave to somewhat quadrate, and correspondingly in the depth of the suture; the ante-medial keel is sometimes obsolete, but the medial depression is always present.

Dimensions.—Length, 60; breadth, 17; height of last whorl, 12.

Localities.—Eocene: River Murray Cliffs (very abundant!); Muddy Creek!; Corio Bay, near Geelong!; Mornington!; Gellibrand River!; Belmont!; Table Cape *(R. M. Johnston!)*. Miocene: Gippsland Lakes (rare!).

T. Murrayana has resemblance to *T. declivis*, Ads. & Reeve, but has not the backward-slanting whorls of that species, which is apparently without a conspicuous sinus in the outer lip. It has also much resemblance to *T. rosea*, Quoy & Gaimard, but in that the spiral ornament of the posterior whorls develop into ribs on the anterior whorls.

The Table Cape specimens have usually flattish or slightly concave whorls with or without the anterior keel, but fall within the limits of variation exhibited by the Murray examples, though they are usually broader in proportion—the apical angle being as much as 18°

11. Turritella platyspira, *Tenison-Woods.* Pl. viii., fig. 9.

Ref.—Proc. Lin. Soc. N.S.W., vol. III, p. 234, t. 20, f. 13, 1878.

Shell acutely pyramidal-turreted, thin, polished; spire subulate-attenuated, ending in a nucleus of two very small rotund turns. Whorls fifteen, the posterior ones flat, the anterior ones slightly convex; ornamented by three inconspicuous (sometimes obsolete) spiral threads, which are equidistant from each other and from the sutures, the interstices faintly spirally striated; a shallow sulcus separates the anterior thread from the medial one; incremental lines deeply flexuous, hardly visible.

Aperture subquadrangular, base finely concentrically lined. Length, 13; width, 3·75.

Localities.—Eocene: Muddy Creek *(Tenison-Woods!)*; River Murray Cliffs!; Gellibrand River!; Fyansford!; Mornington!.

T. platyspira resembles *T. congelata*, Ads. & Reeve, but that shell seems to be wanting in the deep sigmoidal growth-lines.

Genus Mesalia.

Mesalia stylacris, *spec. nov.* Pl. ix., fig. 2.

Shell minute, thin, and pyramidally turreted, with a mucronate apex; pullus cylindric of four narrow convex whorls; spire-whorls five, convex or subangulated medially, ornamented by

about seven narrow flat threads; body-whorl convex to the rounded or subangulated periphery; lirate and crossed by slightly sigmoidal incremental striæ; base flattened or subconvex; aperture oval; outer lip thin, medially ecurved; columella thick, arched, flattened, and margined at the exterior, callously united to the outer lip.

Dimensions.—Length, 4; breadth, 2 (vix.).

Locality.—Eocene: "Turritella-banks," Blanche Point, Aldinga Cliffs (common !).

This diminutive species of the genus is otherwise distinguished by its styliform apex.

FAMILY VERMETIDÆ.

Genus Thylacodes.

Shell adherent, irregularly twisted, without laminæ or keels internal, but frequently concamerated.

SYNOPSIS OF SPECIES.

Posteriorly compactly coiled, afterwards lengthened.
- Whorls embracing forming a broad cone. 1. *actinotus.*
- Whorls contiguous forming a cylinder.
  - Surface lirate and finely costate. 2. *cratericulus.*
  - Surface roundly costate. 3. *conohelix.*

Posteriorly irregularly and loosely coiled.
- Uncoiled portion much extended, densely squamosely ribbed. 4. *asper*
- Uncoiled portion short; distantly ribbed. 5. *rudis.*

Shell vermiculate, slender, finely sculptured. 6. *Adelaidensis.*

1. Thylacodes actinotus, *spec. nov.* Pl. ix., fig. 1.

Solitary or rarely two together; whorls embracing and reciprocally adherent except the last turn, which is extended into a very short erect tube. The aggregate mass is broadly conical; ornamented with thin lamellose radial ridge; the free tubular portion circular in section.

Dimensions.—Diameters, 5 to 6; height (ex. free tube), 2·5.

Locality.—Eocene: Adelaide-bore !.

2. Thylacodes cratericulus, *spec. nov.* Pl. ix., fig. 3.

Solitary or two together, early whorls irregularly coiled, anterior whorls compacted, irregularly conoid or shortly cylindroid, finally obliquely-extended into a long much-narrowed tube. Whorls ornamented with five or six spiral ridges crossed by straight threads producing square or oblong fenestrations; basal part of tube similarly ornamented gradually becoming obsolete towards the extremity.

Dimensions.—Diameters of base, 6·5 and 5·5 ; length of tube, 8 ; its diameter, 1·5.

Localities.—Eocene : Muddy Creek ! ; Mornington ! ; Fyansford ! ; Gellibrand River !.

3. Thylacodes conohelix, *Ten.-Woods.* Pl. ix., fig. 11.

Vermetus conohelix, Tenison-Woods, Proc. Roy. Soc. Tasm. for 1876, p. 100, 1877.

Solitary, "tube adhering, corrugated, coiled ; lower whorls laterally depressed into a ridge, and coiled upon each other with a truncated flattened hollow cone of two whorls, at the apex the tube becomes free, obliquely erect, flexuous, and cylindrical ; aperture somewhat thick and orbicular. Height of cone, 3 ; breadth, 6 ; length of free end, 5 ; width of aperture, 1."

The common form of this shell at Spring Creek, which I figure, has a more contracted base, and the anterior whorls forming a cylinder.

Localities. — Table Cape *(Ten.-Woods !)* ; Spring Creek (common !) ; Moorabool Valley, and Bellarine Peninsula *(G. B. Pritchard !)*.

4. Thylacodes asper, *spec. nov.* Pl. ix., fig. 10.

Solitary, early whorls more or less regularly convolute ; finally horizontally extended, at first attached, but largely free. Free tube with crowded, slightly elevated longitudinal ribs, narrower than the sulci, crossed by intricately-disposed lamellar threads, which produce asperities on the ribs.

Dimensions.—Diameter of the close spiral, 6 ; of free tube, 3·5.

Locality.—Eocene: Gellibrand River !.

5. Thylacodes rudis, *spec. nov.* Pl. ix., fig. 8.

Usually solitary ; base contortedly coiled, broadly and laterally attached ; anterior whorls rounded, more loosely coiled and irregularly bent, free part of tube short, not contracted, circular in section. The early whorls are concamerated. Surface ornamented with longitudinal liræ, about eleven on upper and lateral areas, distantly squamosely elevated.

Dimensions.—Diameter of aggregate mass, about 25 ; diameter of tube, 5·5 to 6.

Locality.—Eocene : Table Cape !, Gellibrand River !.

This species is the fossil analogue of *Vermetus arenarius*, Quoy and Gaimard, from which it differs by less-compactly-coiled and abruptly-bent whorls, and fewness of longitudinal liræ.

6. Thylacodes Adelaidensis, *spec. nov.* Pl. ix., fig. 9.

Solitary. Attached portion not known. Free part filiform, irregularly bent, circular in section ; surface ornamented with

slender, obtuse threads, about 25 at the widest part (sometimes obsolete), minutely squamosely elevated at the intercrossing of regular circumscribing striæ.

Dimensions.—Known only by fragments, the greatest diameter of which is 2·5 ; diameter at the only partition observed, 1.

Localities.—Eocene : Adelaide bore and "Turritella-beds," Aldinga Cliffs.

This species closely resembles in size and form *V. anguillinus*, Desh., of the Parisian Eocene, with actual specimens of which I have made comparison, but differs from it by more distant threads.

EPPLANATION TO PLATES VI. TO X.

N.B.—The figures are of the uatural size, except when otherwise stated.

Plate VI.

Fig.
1. Natica sub-Noæ, *Tate*. Spring Creek, 2x.
2. Natica varians, *Tate*. Muddy Creek.
3. Natica substolida, *Tate*. Muddy Creek.
4. Natica gibbosa, *Hutton*. Murray Desert.
5. Natica Mooraboolensis, *Tate*. Moorabool River.
6. Natica subinfundibulum, *Tate*. Muddy Oreek.
7. Natica balteatella, *Tate*. Pliocene : Dry Creek-bore.
8. Natica subvarians, *Tate*. Aldinga Cliffs.
9. Natica varians, *Tate*. Muddy Creek.
10. Natica subvarians, *Tate*. Gippsland.

Plate VII.

Fig.
1. Calyptraea subtabulata, *Tate*. Table Cape.
2. Calyptraea crassa, *Tate*. Gippsland.
3. Calyptraea undulata, *Tate*. Muddy Creek.
4. Calyptraea placuna, *Tate*. Adelaide-bore.
5. Heligmope Dennanti, *Tate*. Muddy Creek.
6. Calyptraea corrugata, *Tate*. Muddy Creek.
7. A young individual variation of *C. crassa*.
8. Capulus circinatus, *Tate*. Adelaide-bore.
9. Calyptropsis arachnoideus, *Tate*. Adelaide-bore.
10. Sigaretus microstira, *Tate*. Spring Creek.

Plate VIII.

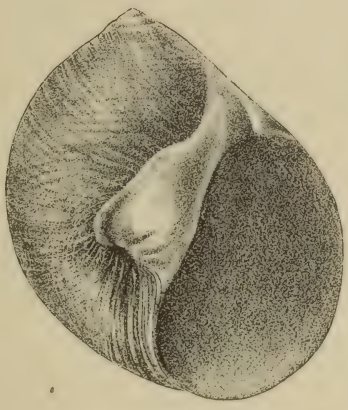
Fig.
1. Turritella Aldingæ, *Tate*. Adelaide-bore.
2. Turritella Warburtoni, *Ten.-Woods*. Table Cape.
3. Turritella Murrayana, *Tate*. River Murray Cliffs.
4. Turritella acricula, *Tate*. River Murray Cliffs.
5. Turritella septifraga, *Tate*. Spring Creek.
6. Turritella Sturtii, *Ten.-Woods*. Table Cape.
7. Turritella conspicabilis, *Tate*. Gippsland.
8. Turritella tristira, *Tate*, var. Gippsland.
9. Turritella platyspira, *Ten.-Woods*. Muddy Creek.
10. Turritella pagodula, *Tate*. Gippsland.
11. Turritella gemmulata, *Tate*. Muddy Creek.

1

2

1a.

3

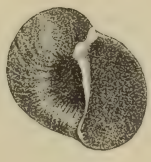


4

3a.

7

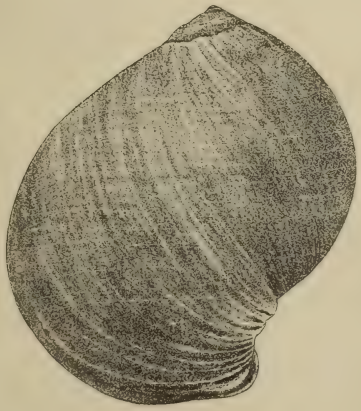
5



6

7a.

8

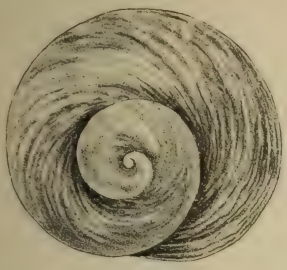


9

10

H.B. lith.

Hussey & Gillingham, Lith.

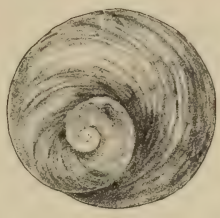


1

1a

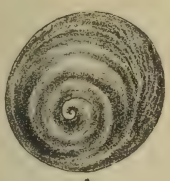
2

2a



3

3a



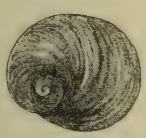
4

4a

5

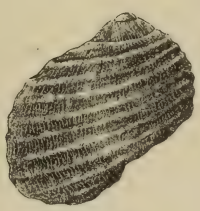
6

6a

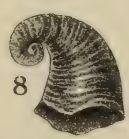


7

7a

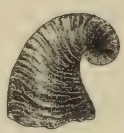


5a



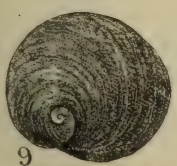
8

8b

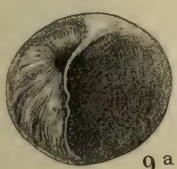


8a

9b



9



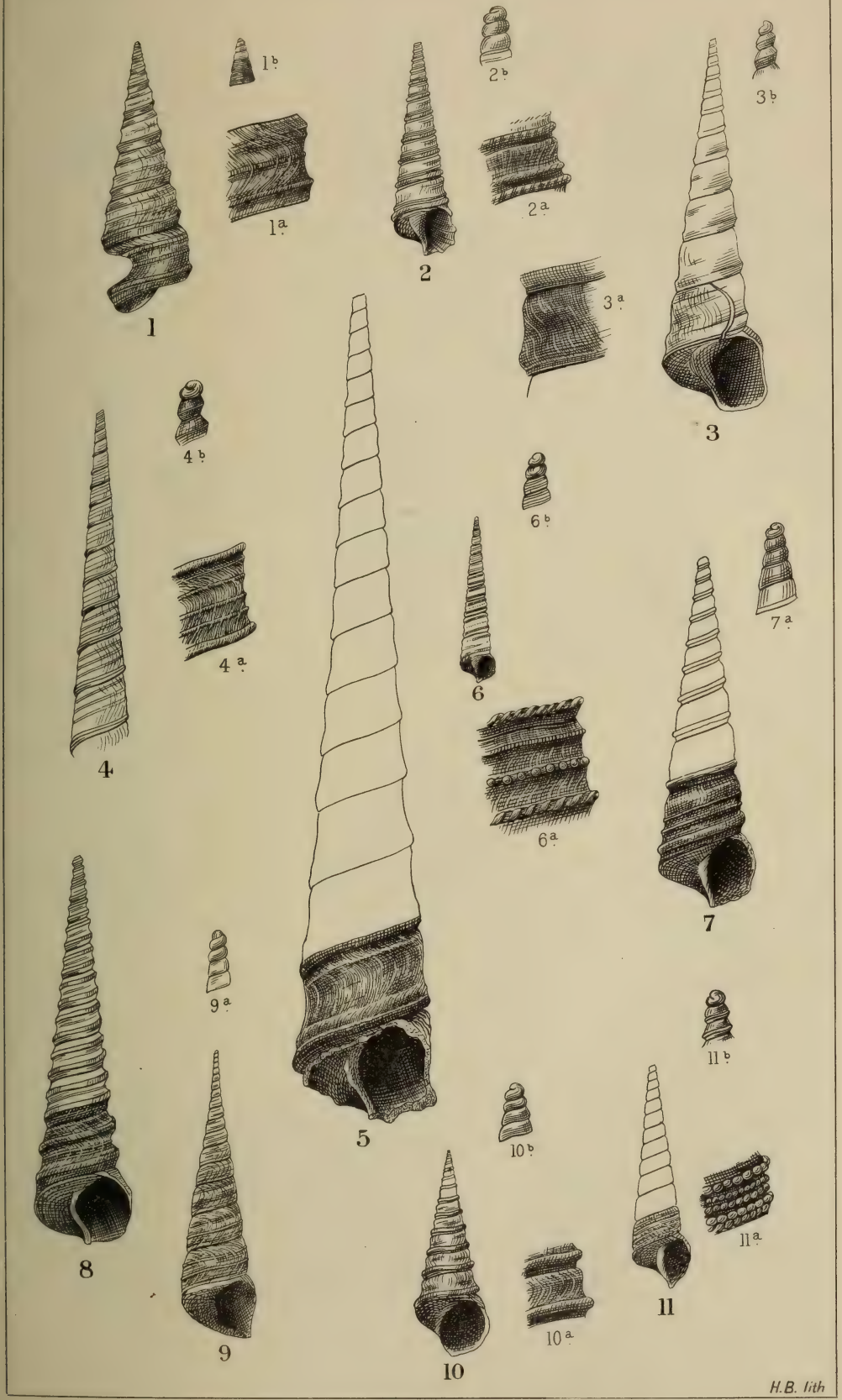
9a

10

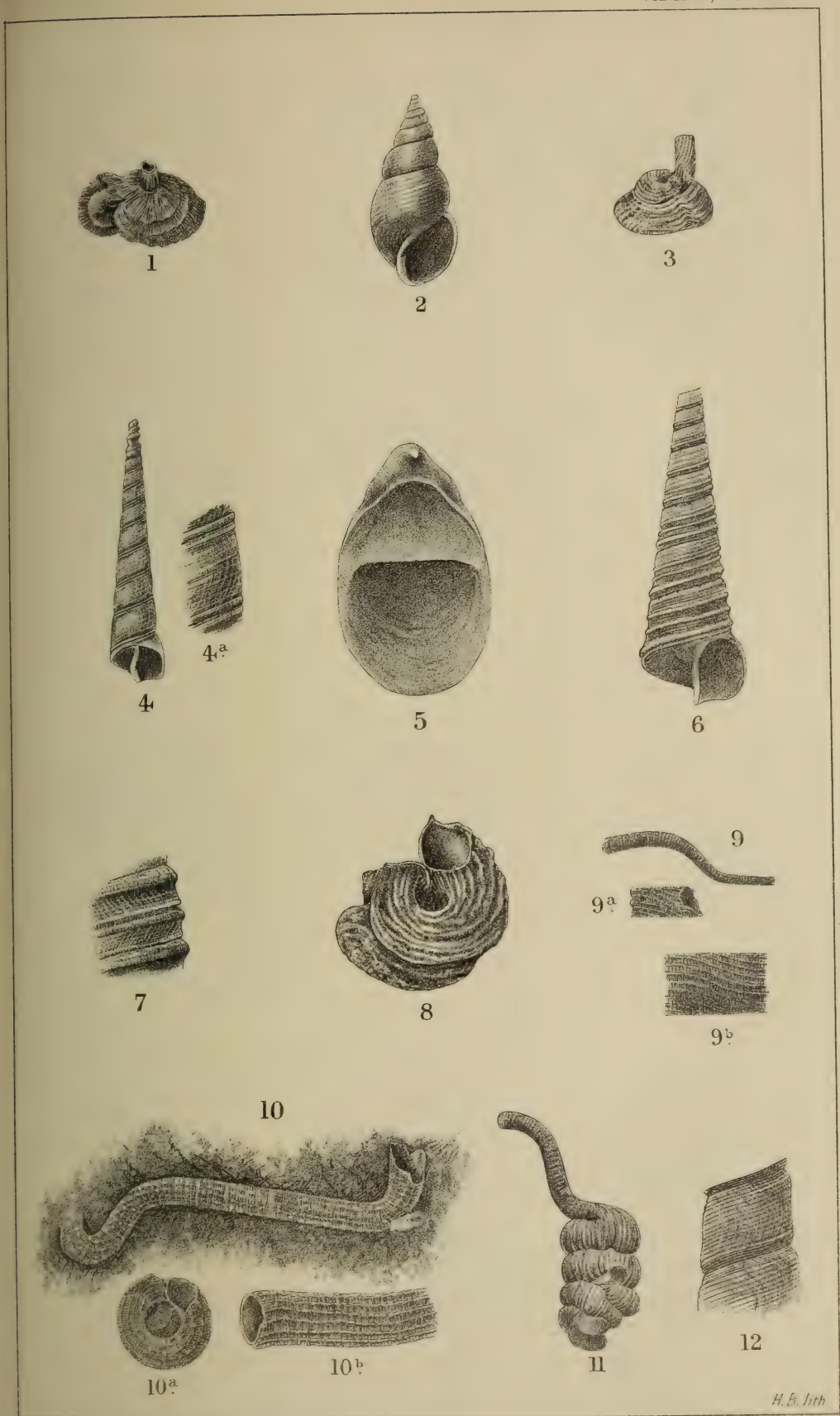
10a

H.B. lith.

Hussey & Gillingham Lith.

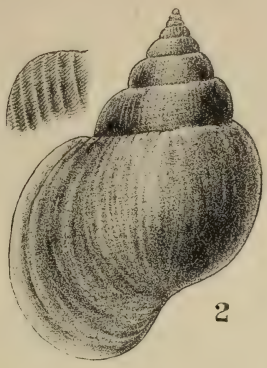


Hussey & Gillingham Lith.

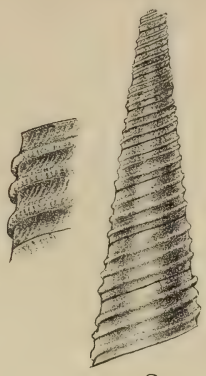


HUSSEY & G[illegible] PAM[illegible]

1



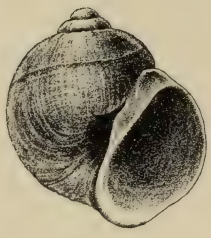
2



3

4

2 a



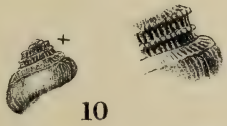
5

6

7

8

9



10

11

11 a

H.B. lith.

Hussey & Gillingham, Lith.

Plate IX.

Fig.
1. Thylacodes actinotus, *Tate*. Adelaide-bore.
2. Mesalia stylacris, *Tate*. Aldinga.
3. Thylacodes cratericulus, *Tate*. Mornington.
4. Turritella acricula, *Tate*, var. Gellibrand River.
5. Crepidula dubitabilis, *Tate*. Gippsland.
6. Turritella conspicabilis, *Tate*, var. Spring Creek.
7. Turritella acricula, *Tate*, var. Gippsland.
8. Thylacodes rudis, *Tate*. Table Cape.
9. Thylacodes Adelaidensis, *Tate*. Adelaide-bore.
10. Thylacodes asper, *Tate*. Gellibrand River.
11. Thylacodes conohelix, *Tenison-Woods*. Spring Creek.
12. Turritella acricula, *Tate*, var. Table Cape.

Plate X.

Fig.
1. Scalaria leptalea, *Tate*. Camperdown. Enlarged 5x., and magnified apex.
2. Euspira effusa. *Tate*. Adelaide-bore. Dorsal aspect and magnified portion of surface ; 2*a*. Aperture of another specimen.
3. Turritella tristira, *Tate*. Table Cape. Nat. size and magnified portion of surface.
4. Natica limata, *Tate*. Muddy Creek. Nat. size and portion of surface enlarged.
5. Natica Aldingensis, *Tate*. Adelaide-bore. (The carination is due to fracture in life.)
6. Natica Hamiltonensis, *Tate*. Muddy Creek.
7. Natica perspectiva, *Tate*. Muddy Creek. Enlarged 1·5x.
8. Natica arata, *Tate*. River Murray Cliffs.
9. Natica vixumbilicata, *Ten.-Woods* Table Cape.
10. Crossea semiornata, *Tate*. Spring Creek. Nat. size and portion of penultimate whorl enlarged.
11. Natica subinfundibulum, *Tate*. Muddy Creek. (Figures not correctly drawn.)

Notes on the Government Borings at Tarkaninna and Mirrabuckinna, with Special Reference to the Foraminifera observed therein.

By Walter Howchin, F.G.S.

[Read October 17, 1893.]

I have been indebted to Mr. J. W. Jones, Conservator of Water, for samples of the two bores which have yielded the results detailed below. In nearly every instance the quantity of material available for treatment has been exceedingly small, the samples not averaging, in the case of Tarkaninna, more than about a quarter of an ounce in weight when washed. The present list of occurrences cannot, therefore, be regarded as in any sense an exhaustive record of the foraminiferal fauna of the beds in question; but in our present limited knowledge of the fossils that pertain to the extensive formations of Cretaceous age in Central Australia they are worthy of record.

MIRRABUCKINNA.

This bore is situated about 20 miles north of the head of Lake Torrens, and 43 miles in a straight line south-west of Hergott. Six samples in all were examined from this boring, the depths being 40 ft., 50 ft., 95 ft., 100 ft., 128 ft., and 153 ft. respectively. The marine remains, so far as the present investigations have been carried, are limited to the first 50 ft. of the section, and belong to the Foraminifera, small fish remains, and traces of mollusca.

Foraminifera.

Reophax fusiformis, *Will.* (common).
Reophax scorpiurus, *Montf.* (common).
Haplophragmium agglutinans, *d'Orb.* (rare).
Haplophragmium canariense, *d'Orb.* (common).
Planispirina celata, *Costa* (mod. common).

Mollusca.

Fragments of a small *Lingula* not uncommon at 40 ft. and 50 ft.

Pisces.

Small fish remains are plentiful in the 50 ft. sample. These

consist of a small but very pretty lanceolate tooth, a very sharp spine probably belonging to the dorsal fin, vertebræ, scale, and a variety of small bones.

FLORA.

In the two uppermost horizons examined (viz., 40 and 50 ft.) very minute seed vessels are common, associated with vegetable tissue, and a few pellets of hydrated oxide of iron. The seed vessels are crushed flat, but show pitted surfaces, and in some cases tripartite divisional lines.

The material from this bore was for the most part a loamy sand, somewhat dense in the dry state, but readily softened by a few hours' soaking in water. The residuum left from the washings was either a very fine sand, that passes freely through a sieve 75 threads to the inch, or minute crystals; the material being reduced in the process from rather less than a fourth to a third of the original weight. The 100-ft. sample is a dark shale, that required a little hand pressure to reduce. At 128 ft. a fine-grained conglomerate occurs, the embedded fragments consisting of a soft greenish slate (chloritic), more or less rounded, the matrix being the finer portions of the same slates reduced to a paste by trituration. The sample next the bed rock (153 ft.) is a somewhat curious bed—an argillaceous sand, thickly studded with small crystals of gypsum of a white or brownish colour, which constitute nearly one-fourth of the mass. Some of the samples from this boring carry a considerable quantity of drift wood and thin streaks of lignite, especially at 95 ft. Below the 50 ft. horizon no marine remains were observed, and the clays partake of a gypseous character. A paucity of fossils is characteristic of the gypseous beds of this formation, and may account for the absence of calcareous organisms in the lower parts of the section.

TARKANINNA.

This boring was put down on the Clayton, about 30 miles north-east of Hergott. It is by far the deepest bore which, up to the present time, has been made in the Cretaceous beds of the lakes district. Twenty samples were examined from the core of this section, ranging from near the surface down to 1,226 feet. The material was found to be fairly fossiliferous throughout, and would no doubt yield many more forms if examined in larger quantities. In many cases the material when washed was so limited that it could have been all held in a lady's thimble.

Name of Species.	Depth in Feet from Surface.																	
	1-44	44-120	151-276	276-298	298-307	307-326	525-530	530-540	540-570	766-864	864	916-952	952-1026	1050	1070	1070-1091	1091-1145	1145-1167	1167-1220	1220-1226
Hyperammina vagans, *Brady* ...	No organic remains—Material consists mainly of small crystals of gypsum.	...	...	...	...	...	...	...	...	?	...	...	...	...	...	...	No organic remains observed—Residium consists mainly of small crystals of gypsum.	...	..	...
Reophax fusiformis, *Will.*		...	x	...	...	...	...	...	x	...	x	x	...	x	...	...		...	...	...
Haplophragmium agglutinans, *d'Orb.*		...	...	...	...	x	...	...	x	x	...	...	...	...	...	...		...	...	...
" canariense, *d'Orb.*...		...	...	...	...	x	...	x	x	...	...	...	...	...	x	x		...	...	...
" australis, *Howchin, M.S.*		...	...	...	...	...	...	...	x	...	...	...	...	...	...	...		...	...	x
Thurammina compressa, *Brady* ...		...	...	...	...	...	...	...	...	...	...	...	...	x	...	...		...	x	...
Planispirina celata, *Costa*		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...		...	...	x
Bigenerina digitata, *d'Orb.*		...	...	...	...	...	...	...	x	x	...	...	...	...	...	...		...	...	...
" nodosaria, *d'Orb.*		x	...	x	x	x	..	...	x	x	...	x	x	...	x	x		...	...	x
Verneuilina polystropha, *Rss.* ...		...	...	...	x	...	...	x	...	...	...	...	...	...	...	...		...	...	...
Gaudryina pupoides, *d'Orb.*		...	...	x	x	x	...	...	x	...	...	x	...	x	x	x		x	...	...
" scabra, *Brady*		...	...	...	...	...	...	...	...		...	...	...	...	...	...		...	...	x
" siphonella, *Rss.*		...	...	...	...	...	...	...	...	...	...	...	...	...	x	...		...	...	...
Vaginulina legumen, *Linn.*		...	...	...	...	...	x	...	...	..	...	...	...	x	...	x		x	x	...
Marginulina costata, *Batsch.* ...		...	...	...	...	...	...	x	...	...	...	...	...	...	...	..		...	..	...
" glabra, *d'Orb.*		...	...	...	...	...	x	...	x	...	...	...	...	...	...	...		...	...	...
Cristellaria crepidula, *F. & M.* ...		...	...	...	..	...	...	...	...	x	...	...	...	...	...	...		x	.	...
" gibba, *d'Orb.*		...	...	...	...	...	...	...	...	...	x	...	...	...	...	...		...	...	...
Anomalina ammonoides, *Rss*... ..		...	...	...	...	...	...	...	...	..	...	...	...	...	...	...		...	...	x
Pulvinulina elegans, *d'Orb.*		...	...	...	...	x	...	...	x	...	x	...	x	...	...	...		...	...	...

As in the case of the borings at Hergott and Mirrabuckinna the Tarkaninna section, although of much greater thickness, preserves a wonderful sameness of character throughout its entire depth, both in its lithological character and palæontological remains. The same similarity is observed when the respective borings are compared with each other, a majority of the species occurring in common over the geological area in question. The respective borings have evidently passed through beds of contemporaneous age, and which must have been deposited under remarkably uniform conditions. This deposit, although between 1,200 and 1,300 feet thick at Tarkaninna, must have had a slow rate of deposition to admit of the presence of Foraminifera living upon the sea bottom. On the other hand, the comparative rarity of marine organisms in this formation, and the remarkable preponderance of the arenaceous types of Foraminifera over those with hyaline tests, seem to point to the presence of muddy water, and a relatively rapid accumulation of sediment on the sea-floor.

The Microzoa observed, other than Foraminifera were, a few entomostraca, fragments of a small *Lingula*, traces of echinoderms, one or two small fish bones, vegetable tissues, and cylindrical pyritous casts.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1892-93.

ORDINARY MEETING, NOVEMBER 3, 1892.

Prof. R. TATE, F.G.S., F.L.S. (President), in the chair.

ALTERATION OF RULES.—The following alteration of rules was carried, namely :—

Rule 36, to read "at a meeting," and not "next before the month of October."

Rule 37, to omit the words "a Secretary," and insert the words "two Secretaries."

Rule 48, instead of "Secretary" to read "two Secretaries."

Rule 49, instead of "Secretary" to read "Secretaries," and instead of "Honorary Secretary" to read "Honorary Secretaries."

ELECTION.—W. C. Grasby was elected the additional Hon. Secretary.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited the lower jaw of a fossil wombat, obtained from the bed of Lyndoch Creek. The fossil had been subjected to much attrition, and the teeth were exposed in their alveoli. The specimen belonged to an adult, but of a smaller species than any now existing. J. G. O. TEPPER, F.L.S., showed some ixias from Lyndoch, which were perfectly white.

PAPERS.—"A Forgotten Relic of Australian Exploration," by E. C. STIRLING, M.D., C.M.G., &c. "Two New Fungi for South Australia," described by Prof. LUDWIG, in the *Zeitschrift für Planzenkrankheiten* (1892), and communicated by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, DECEMBER 6, 1892.

Prof. TATE, F.G.S., F.L.S. (President), in the chair.

BALLOT.—P. H. PRIESTLEY was elected a Fellow.

EXHIBITS.—J. G. O. TEPPER, F.L.S., exhibited the fruits of *Posidonia australis*. Prof. TATE, F.G.S., showed specimens of

Convolvulus sepium in flower, gathered near the Frome Bridge, Adelaide. Also a specimen of the so-called lias-limestone, from the cement works at Brighton. He pointed out that it had no petrological relationship with the true Lias limestone of Europe, the latter being argillaceous limestone, whilst the Brighton sample is siliceous. He expressed the opinion that the specimen exhibited did not in itself contain the constituents for forming a good cement. Oswald Lower, F.Ent.S., laid on the table specimens of the male and female butterfly *Teinopalpus imperialis*.

Papers.—Papers relating to the Elder Exploring Expedition were contributed by Victor Streich; Baron F. v. Mueller and Prof. Tate, F.G.S.; and Dr. Stirling and A. Zietz (the Assistant Director of the Museum).

Ordinary Meeting, February 7, 1893.

Maurice Holtze, F.L.S. (Vice-President), in the chair.

Recognition of Merit.—The Chairman referred to the honor conferred upon Prof. Tate, F.G.S. (their President), in being awarded the Clark Memorial Medal, by the Royal Society New South Wales, in recognition of his services as a worker in the domains of science; especially for his numerous and invaluable contributions to the geology and palæontology of Great Britain and South Australia.

Exhibits.—Maurice Holtze, F.L.S., laid on the table a painting by Miss Tepper of the *Victoria Regia*, at present in bloom in the Botanic Gardens of Adelaide. J. G. O. Tepper, F.L.S., exhibited a specimen of the family *Heterogamidæ*, hitherto unknown in South Australia, and collected at Fowler's Bay by Prof. Tate, F.G.S. The species was new, and had been named by Mr. Tepper *Ataxigamia Tatei*.

Oswald Lower, F.Ent.S., showed specimens of the genus *Ogyris* of Westwood (*Fam. Lycænidæ*.) Of the nine species known seven were exhibited, five of these being native to South Australia.

Ballot.—Robert Brummitt, M.R.C.S., Eng., and Victor Streich were elected Fellows.

Papers.—"The Flora of Roebuck Bay, W.A." by J. G. O. Tepper, F.L.S. "A few words about Pearls," by A. F. Calvert, "List of Rhopalocera," by Oswald Lower, F.Ent.S.

Ordinary Meeting, March 7, 1893.

Maurice Holtze, F.L.S. (Vice-President), in the chair.

Exhibits.—Oswald Lower, F.Ent.S., forwarded a specimen of South African Moth, *Leto Venus*, one of the most resplendent

of the *Hepialidæ*. J. G. O. Tepper, F.L.S., exhibited *Pomaderris vaciniifolia*, new for South Australia, and collected on the hill tops bounding the River Torrens Gorge. Maurice Holtze, F.L.S., showed specimens of maize in which the male flowers had taken on the characters of the female, and *vice versa*.

Ballot.—Thomas James, M.R.C.S., Eng., and W. T. Bednall were elected Fellows.

Papers.—"The Blattariæ of Australia and Polynesia," by J. G. O. Tepper, F.L.S. "The Mirrn-Yong Heaps at Morgan, South Australia," by R. Etheridge, jun., F.G.S.

Ordinary Meeting, April 4, 1893.

Prof. Tate, F.G.S., F.L.S., (President), in the chair.

Ballot.—R. H. Perks, M.D., was elected a Fellow.

Exhibits.—J. G. O. Tepper, F.L.S., showed a new parasite (*Thalpochares dubia*, Butler) of the black scale, *Lecanium testudo*. Prof. Tate, F.G.S., exhibited for Mr. Marsh, of Broken Hill, N.S.W., a new mineral of iodide of copper, which Prof. Liversidge had named "Marshite." Oswald Lower, F.Ent.S., forwarded specimens of *Morpho Sulkowskyi*, a Brazilian butterfly.

Motion.—It was carried "that the Council of the Society make enquiries of the Queensland Government as to whether Mr. F. M. Bailey, the Government Botanist, is authorised by it to write a continuation of or supplement to the "Flora Australiensis," of Bentham and Mueller, and that in the event of a reply being received in the affirmative, that the Council be instructed to protest against the assumption of the title for the proposed work.

Papers.—"Description of a New Mineral (Stibiotantalite)," by G. A. Goyder, F.C.S. "Description of a New Genus, and Five Species of Australian Nitidulidæ and Colydiidæ," by E. Grouvelle. "Descriptions of New Australian Coleoptera," by Rev. Thomas Blackburn, B.A.

Ordinary Meeting, May 2, 1893.

Prof. Tate, F.G.S., F.L.S. (President), in the chair.

Exhibits.—Prof. Tate, F.G.S., exhibited a collection of Silurian Fossils, from the MacDonnell ranges, forwarded by Mr. Thornton, comprising fifteen species. R. W. Chapman, M.A., brought under the notice of the meeting a collection of electrical breath-figures prepared by himself, together with photographs of the same.

PAPERS.—"Correlation of Marine Tertiaries of Australia (part I.)," by Prof. TATE, F.G.S. and JOHN DENNANT, F.G.S. "Descriptions of New Lepidoptera," by OSWALD LOWER, F.Ent.S.

ORDINARY MEETING, JUNE 6, 1893.

Prof. TATE, F.G.S., F.L.S. (President), in the chair.

RECOGNITION OF MERIT.—The President drew the attention of the meeting to the distinctions recently conferred by Her Majesty the Queen on two of the Fellows of the Society, namely, Sir Charles Todd, K.C.M.G., and Dr. E. C. Stirling, C.M.G., both of whom had taken an active part in the Society's work in the past. It was carried that the Society record its congratulations.

BALLOT—URIAH DUDLEY was elected a Fellow.

EXHIBITS.—MAURICE HOLTZE, F.L.S., exhibited chipped tools made by the aborigines of Western Australia from glass bottles, also specimens of the true "rose of Jericho" (*Asteriscus pygmæa*) and the Californian "resurrection plant" (*Selaginella lepidophylla*). W. T. BEDNALL, showed specimens of rare exotic shells, and drew particular attention to a cast of *Pleurotomaria Adansoniana*, the original of which was taken off Tobago, West Indies. WALTER GILL, F.L.S., laid on the table dates from six years old palms, growing at Hergott Springs, S.A.

PAPERS.—"Poisonous Constituents of *Stephania hernandifolia*," by Prof. RENNIE, D. Sc., and E. F. TURNER. "New Species of Australian Marine Gastropoda," by Prof. TATE, F.G.S. "Additions to the List of S.A. Marine Gastropods," by Prof. TATE, F.G.S. "Descriptions of S.A. Brachyscelid Galls," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, JULY 4, 1893.

Prof. TATE, F.G.S., F.L.S. (President), in the chair.

BALLOT.—LAURENCE BIRKS was elected an Associate.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited specimens of igneous and metamorphic rocks from Granite Island, Port Victor, and The Bluff, Encounter Bay, showing how in parts the granite appeared to be intrusive and in others bedded. Also from the same localities, specimens of diorite, the only other known place for the occurrence of this mineral in South Australia being Kangaroo Island. J. G. O. TEPPER, F.L.S., showed *Carteria acaciæ* (Maskell), a brachyscelid, which instead of forming galls, is covered with thick reddish waxy tests. These were forwarded from Central Australia by Miss Dickenson. Also *Cylindrococcus amplia* (Maskell) as occurring on *Casuarina quadrivalvis* at Mt. Lofty. Mr. Maskell had recently placed

this and another genus in the new sub-family *Idiococcinæ*. Also *Inglesia foraminifer* as infesting *Santalum acuminatum*, a New Zealand species of scale-insect, recorded for the first time as occurring in South Australia. He also reported that *Icerya Purchasi* had attacked a species of *Cocoloba*, a leafless plant of South Africa.

Papers.—"Respecting the Anthropology of the Daly River (N.T.) Aborigines," by Rev. Donald Mackillop, S.J.

Ordinary Meeting, August 1, 1893.

Prof. Tate, F.G.S., F.L.S. (President), in the chair.

Ballot.—Rev. Donald Mackillop, S.J., was elected a Corresponding Member.

Exhibits.—Maurice Holtze, F.L.S., laid on the table from the Adelaide Botanic Gardens, the sheathing spathe of a leaf of *Kentia Wendtlandi*, a Northern Territory palm, used by the aborigines for making into vessels, &c., for holding water. This use is limited to the locality in which the palm is indigenous. Prof Tate, F.G.S., exhibited a species of *Euomphalus* indicative of the Silurian epoch, obtained far to the east of the MacDonnell Range. Also a specimen of *Turbo Jourdani*, a large and rare marine shell, obtained in a sub-fossilised state from the silt of the Port Creek, at a depth of about 24 feet. J. G. O. Tepper, F.L.S., showed a collection of the coleoptera and hymenoptera from the Elder Exploring Expedition.

Paper.—"Customs and Superstitions of the Aboriginal Tribes, Gulf of Carpentaria," by W. G. Stretton, S.M.

Ordinary Meeting, September 5, 1893.

Prof. Tate, F.G.S., F.L.S. (President), in the chair.

Ballot.—W. G. Stretton, S.M., was elected a Corresponding Member.

Exhibits.—J. G. O. Tepper, F.L.S., laid on the table a specimen of *Calla Æthiopica* with three spathes from one stalk. Also *Crinum flaccidum* from Wilcannia, River Darling. Also *Acacia pravifolia* from Gawler, a new locality. J. J. East, F.G.S., illustrated and described some unrecorded skeletal characters of *Coscinocyathus Tatei*, a coral of the *Archæocyathinæ* family, from the Cambrian limestone, at the Elvina Mine, eleven miles N.W. of Beltana. J. J. Eckert forwarded analyctical drawings of *Darwinia Schuermanni* with a short biographical sketch of the late Rev. C. W. Schuermann, after whom the plant had been named by Baron F. von. Mueller in 1851 from specimens collected at Port Lincoln, S.A.

Paper.—"Notes on the Lacustrine Origin of the Mammaliferous Deposit at Lake Mulligan, S.A.," by Prof. Tate, F.G.S.

Annual Meeting, October 17, 1893.

Prof. Tate, F.G.S., F.L.S. (President), in the chair.

Auditor.—D. J. Adcock was elected Auditor, for the current year.

Ballot.—Marquis de Gregorio, Palermo, and M. Cossmann, Paris, were elected Honorary Fellows of the Society.

Reports.—The Annual Report of the Council and Balance-sheet were read and adopted. The Annual Reports and Balance-sheets of the Field Naturalists' Section, the Microscopical Section, and the Astronomical Section, were accepted.

Election of Council.—The Council for the ensuing year was elected as follows:—President, Prof. Tate, F.G.S., F.L.S.; Vice-Presidents, Rev. Thomas Blackburn, B.A., and Maurice Holtze, F.L.S.; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretaries, W. L. Cleland, M.B., and W. C. Grasby; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., C.M.G., F.R.S., Walter Howchin, F.G.S., Samuel Dixon, J. S. Lloyd, and W. B. Poole.

Alteration of Rules.—The alterations in rules 36, 37, 48 and 49 made at the November meeting were confirmed.

Exhibits.—W. G. Howchin, F.G.S., exhibited a fossil sponge *Hyalostelia* from the Silurian rocks of the McDonnell Range, forwarded by Mr. Thornton, of Temple Downs. The only other site where it is known to occur in South Australia is in the Cambrian Rocks at Curramulka. J. G. O. Tepper, F.L.S., showed a collection of plants from the S.W. of Western Australia. George Sweet, F.G.S., forwarded through Prof. Tate, F.G.S., specimens of the fossil flora of the Leigh Creek coal-basin, which contained the following:—*Thinnfeldia odontopteroides*, and *T. media*; *Equisetum*, two species; *Tæniopteris*, two species; *Macrotæniopteris Wianamattæ*; *Trichomanites laxum (?)*; and *Otozomanites*, new species.

Papers.—"Notes and Remarks of S.A. Rhopalocera," by J. G. O. Tepper, F.L.S. "New Australian Heterocera," by Oswald Lower, F.Ent.S. "Descriptions of New Coleoptera," by Rev. Thos. Blackburn, B.A. "Gastropods of the Older Tertiaries, Australia" and "New Fossil Gastropods," by Prof. Tate, F.G.S.

ANNUAL REPORT.

The Council has to report that the scientific work of the Society has been carried on successfully during the past year. In addition to papers from local workers, the Society has received valuable contributions from scientific authorities in Europe, to whom material had been forwarded for critical determination. Part I. of the current year's transactions was published in July, and it is anticipated that part II., completing vol. XVII., will be ready for distribution in December. As has before been stated, vol. XVI. has been reserved for the scientific results of the Elder Exploring Expedition, of which parts I. and II. have already been published.

During the past year two Corresponding Members have been elected, viz., the Rev. D. Mackillop, S.J., and W. G. Stretton, who have both added to our knowledge of the ethnology of the Northern Territory of South Australia. There have also been elected seven Fellows and one Associate. You will also be asked to ballot as Honorary Fellows the two distinguished scientists, Marquis de Gregorio and M. Cossmann, whom the Council has thought proper to recommend on account of their valuable services to the Society and their distinguished position in science.

The following Fellows have resigned :—Edwin Ashby, E. C. Saunders, and W. Russell ; and as an Associate—Mrs. Hodgson, who was elected in 1884.

The following Fellows have had their names removed by the Council for non-payment of arrears of subscription :—Thomas Eyers, A. T. Magarey, M. Salom, J. J. Stuckey, and P. H. Priestley.

The Council has also the melancholy duty of reporting the death of two Fellows—Dr. Renner and Dr. Davies Thomas.

In the premature death of Dr. Davies Thomas science lost one of her most ardent and indefatigable students in a domain which he had made all his own, namely, the study of the life-history in Australia of Hydatids. The medical bearing of most of the subject rendered the Transactions of this Society not the best suited for the publication of the results of Dr. Davies Thomas' researches, hence the small reference made to them in its pages. A monograph, however, is in the press dealing with the whole subject of his investigations, and containing as well some posthumous articles of Dr. Davies Thomas, which will form a

fitting memorial of one distinguished alike for his ability and industry.

The membership of the Society consists at the present time of 11 Hon. Fellows, 75 Fellows, 16 Corresponding Members, and 1 Associate.

Three new exchanges with learned Societies have been made, namely, the Stavanger Museum, Norway; the Annuaire Géologique, Paris; and the Société des Sciences Naturelles de l'Ouest de France, Nantes.

It has been noticed with satisfaction that Baron v. Mueller has decided to publish additional and supplementary volumes to the classical "Flora Australiensis."

Since the last annual meeting it has been decided to have two Hon. Secretaries instead of one, so that more attention might be given to the arrangement and care of the many valuable serial publications which the Society is constantly receiving from all parts of the world. For this purpose a slight verbal alteration of some of the rules was rendered necessary, and duly carried out at a general meeting. The date fixed for the election of an Auditor was also altered.

The statement of receipts and expenditure shows that the publication item has been extremely heavy during the past year.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
Oct. 1, 1892.						
To Balance				276	9	6
" Subscriptions—						
Royal Society	70	1	0			
Field Naturalists' Section ...	17	0	0			
Microscopical Section	5	0	0			
Astronomical Section	7	0	0			
				99	1	0
" Grant from Government				118	9	0
" Interest				7	8	0
" Sale of Transactions				7	10	0
				£508	17	6

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing and Binding (Annual Volume)	150	7	7			
Illustrating (Annual Volume) ...	20	17	6			
Publishing " " ...	9	0	10			
Elder Exploration Volume ...	152	1	1			
				332	7	0
" Wages—Caretaker				3	0	0
" Printing, Postage, and Stationery...				9	18	11
" Advertising				9	0	5
" Library—Binding				25	10	0
" Grants—Field Naturalists' Section	20	0	0			
Microscopical Section ...	5	0	0			
				25	0	0
Sept. 30, 1893.						
By Balance—Union Bank	52	13	2			
Savings Bank	51	8	0			
				104	1	2
				£508	17	6

Audited and found correct.
D. J. ADCOCK, Auditor.
Oct. 12, 1893.

WALTER RUTT, Treasurer.

DONATIONS TO THE LIBRARY

For the Year 1892-93.

TRANSACTIONS, JOURNALS, AND REPORTS.

Presented by the respective Societies, Editors, and Governments.

Argentine States.

Buenos Aires—Boletin de la Academia Nacional de Ciencias, tomes X. and XI.

Austria and Germany.

Berlin—Verhandlungen Gesellschaft für Erdkunde, band XIX., Nos. 6 to 10; XX., Nos. 1 to 6.

——— Zeitschrift, ditto, band XXVI.; XXVII., Nos. 2 to 6; XXVII., Nos. 1 and 2.

——— Sitzungsberichte Königlich Preussischen Akademie der Wissenschaften zu Berlin, Nos. 26 to 55, 1892.

——— Abhandlungen der Königlich Preussischen Meteorologischen Instituts:—Ergebnisse der Niederschlogs Beobachtungen, im er Jahre 1891. Ergebnisse der Meteorologischen Beobachtungen, heft I., II., III., 1892.

Bonn—Naturhistorischen Vereins der Preussischen-Rheinlande Westfalens und des Reg:—Bezirks Osnabruch, verhandlungen hälpte 1, 2, 1892.

Freiburg—Berichte über des Verhandlungen des Gesellschaft für Beförderung der Natur-Wissenschaften; publications from 1855 to 1885 and band I. to VI.

Giessen—Oberheissischen Gesellschaft fur Natur und Heilkunde, Report 29.

Gottingen—Nachrichten von der K. Gesellschaft der Wissenschaften u. der Georg-August Universitat, Nos. 1 to 11, 1891; 1 to 10, 1893.

Halle—Leopoldina, heft 27, 1891.

——— Nova Acta der K. Leop. Carol. Deutchen Akad. der Naturforscher, band LV., No. 6; LVI., No. 2; LVII., No. 4; LVIII., No. 1.

Vienna—Verhandlungen der K. K. Geologischen Reichenstalt, Nos. 6 to 18, 1892; Nos. 1 to 5, 1893.

Vienna—Kaiserliche Akad. der Wissenschaften in Wien, Nos. 19 to 27, 1892 ; Nos. 1 to 19, 1893.
——— K. K. Gradmessungs-Bureau, Astronomische Arbeiten, band IV.
——— Verhandlungen der K. K. Zoologisch-Botanischen Gesellschaft in Wien, band XLII., quart. 1 and 2.
——— Annalen des K. K. Naturhistorischen Hof Museums, band VII., Nos. 1 to 4; band VIII., Nos. 1 and 2.
Wurzburg—Zitzungsberichte der Physikalisch-Medicinischen Gesellschaft Nos. 1 to 10, 1892.

BELGIUM.

Brussels—Annales Société Royale Malacologique, tome XXVI., 1891.

BRAZIL.

Rio de Janeiro—Annales de l' Observatiore Impêriale ; Le Climate de Rio de Janeiro ; Annuario, 1892.

CANADA.

Halifax—Proceedings Nova Scotian Institute of Natural Science, vol. I., part 1 (second series).
Montreal—Canadian Record of Science, vol. V., Nos. 1 and 3 to 5.
——— Geological and Natural History Survey of Canada, Annual Report, 1888-89 ; Maps.
Toronto—Transactions Canadian Institute, vol. II., part 5 ; vol. III., part 1.

CAPE COLONY.

Cape Town—Transactions of South African Philosophical Society, vol. VI., parts 1 and 2.

CHILE.

Santiago—Archives de la Société Scientifiqia, tomes II., Nos. 1 to 3.

FRANCE.

Angers—Bulletin de la Société d' Etudes Scientifiques d' Angers, année XX., 1891.
Caen—Bulletin de la Société Linnéenne de Normandie, vols. IV. and V., 1890 and 1891.
Havre—Bulletin de la Société Géologique de Normandie, vol. XIII., Nos. 87 to 89.
Nantes—Bulletin de la Société des Sciences Naturelles de l' Ouest de la France, vol. I., Nos. 1 to 4 ; vol. II., Nos. 1 to 3.

Paris—Feuilles des Jeunes Naturalistes, series III., Nos. 264 to 275.

—— Bulletin Entomologique, pp. 201 to 280, 1892; and 1 to 272, 1893.

Great Britain and Ireland.

Belfast—Report and Proceedings Belfast Natural History and Philosophical Society, session 1891-92.

Dublin—Transactions Royal Irish Academy, vol. XXX., parts 1 to 4.

——— Proceedings ditto, vol. II. (third series), Nos. 3 and 4.

——— Scientific Proceedings Royal Dublin Society, vol. VII., parts 3 and 4.

——— Transactions ditto, vols. IX. to XIII.

Edinburgh—Royal Physical Society, session 1891-92.

London—Journal Royal Microscopical Society, parts 5 and 6, 1892; and 1 to 4, 1893.

——— Proceedings Royal Society, Nos. 313 to 325.

——— Catalogue British Museum—Birds, vols. XVI. and XVII.

——— Royal Colonial Institute, Proceedings, vol. XXIII.

——— Entomological Society, Transactions, 1890-91-92.

——— Chemical Society, Journal, vols. LXIII. and LXIV.

——— Kew Gardens, Bulletins, 1892.

Leeds—Journal of Conchology, vol. VII., Nos. 1 to 7.

Manchester—Memoirs and Proceedings Manchester Literary and Philosophical Society, vol. V., No. 2; vol. VI., vol. VII., Nos. 1 to 3.

———— Journal Manchester Geographical Society, vol. VII., Nos. 10 to 12; vol. VIII., Nos. 1 to 6.

India.

Calcutta—Indian Museum—Economic Entomology, vol. II., No. 6; vol. III., Nos. 1 and 2. List of Batrachians.

Italy.

Turin—Bolletino dei Musie di Zoologia ed Anatomia Comparata dello R. Università di Torino, vol. VII., Nos. 127 to 135; vol. VIII., Nos. 136 to 150.

Pisa—Atti dello Società Toscana de Scienze Naturali, vol. VIII., pp. 85 to 148 and 175 to 232.

Japan.

Tokio—Journal College of Science, Imperial University, vol. V., parts 3 and 4; vol. VI., parts 1 and 2.

—— Calendar, 1891-92.

Mexico.

Mexico—Memoirs de la Sociedad Cientifica (Antonio Alzate), tomo VI., Nos. 1 to 6 and 9 to 10.

New South Wales.

Sydney—Records of the Australian Museum, vol. II., No. 4; Report of Trustees for 1892.
——— Monographs Australian Museum; Catalogue XV., part 3, Marine Shells of Australia and Tasmania; Calalogue XVI., Australian Mammals; Report of Museum, 1891.
——— Technological Museum, Technical Education Series, No. 10.
——— Australian Association Advance. Science, vol. IV.
——— Department of Mines—Records Geological Survey, vol. III., parts 1 to 3; Memoirs ditto, Palæontology, No. 5; Echinodermata, Annelida and Crustacea of the Permo-Carboniferous; Annual Reports, 1892.
——— Agricultural Gazette, vol. II., parts 8 to 12; vol. III., parts 10 to 12; vol. IV., parts 1 to 8.
——— Proceedings Linnean Society, vol. VII., parts 2 to 4; vol. VIII., part 1.
——— Proceedings Royal Society, N.S.W., vol. XXVI.
——— Sydney Observatory—Reports
——— Sydney University—Calendar, 1893.

New Zealand.

Wellington—Colonial Museum and Laboratory—Annual Report (twenty-seventh).
——————— Transactions and Proceedings New Zealand Institute, vol. XXV., 1892; Manual of New Zealand Coleoptera, parts 5, 6, and 7.

Norway and Sweden.

Bergen—Bergens Museum Aarsberetning, 1891.
Stavanger—Museum, Aarsberetning, 1891.
Upsala—University—Geological Bulletin, vol. I., No. 1.
Stockholm—Geologisha Föreningens, band XIV., hefte 6 and 7.
———— Entomologisk Tidskrift, hefte 1 to 4, 1893.
Trondjem—Société Royale Norwégienne des Sciences, skrifter, 1891.

Queensland.

Brisbane—Bulletin Department of Agriculture, Nos. 20 and 21.
———— Annual Report Queensland Museum, 1891-92.
———— Reports of Geological and Palæontological Survey.
———— Proceedings Royal Society of Queensland, 1892-93.

Russia.

Kiew—Memoirs de la Société des Naturalistes, tome XII., parts 1 and 2
Moscow—Bulletin de la Société Impériale des Naturalistes, Nos. 2 to 4, 1892; and No. 1, 1893.
St. Petersburg—Bulletin du Comité Geologique, vol. XI., Nos. 1 to 10; vol. XII., Nos. 1 and 2.

South Australia.

Adelaide—Report Board of Governors Public Library, Museum, and Art Gallery, 1891-92.
——— Meteorological Obsevations, Adelaide Observatory, 1890 (Sir Charles Todd, M.A., K.C.M.G., F.R.S.).
——— Weather Reports, ditto, 1892-93.
——— Government Geologist's Department Reports.

Straits Settlements.

Perak—Government Gazette.

Switzerland.

Geneva—Compte Rendu des Séances de la Société de Physique et d'Histoire Naturelle, Memoirs (Centenaire), No. IX., 1892.
Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles, vol. XXVIII., 107 to 109; vol. XXIX., 110 to 111.

Tasmania.

Hobart—Parliamentary Papers.
——— Royal Society of Tasmania—Abstract of Proceedings, 1892.

United States America.

Baltimore—John Hopkins' University Studies, series X., Nos. 4 to 11.
——— Circulars ditto, vol. XI., Nos. 101 to 104; vol. XII., Nos. 105 to 107.
——— American Chemical Journal, vol. XIV., Nos. 2 to 7.
Boston—Proceedings American Academy Arts and Sciences, vol. XVIII., 1890-91.
——— Proceedings Boston Society Natural History, vol. XXV., parts 3 and 4, 1891-92.
——— Memoirs Boston Society Natural History, vol. IV., No. 10, 1892.

Cambridge—Bulletin Museum Comparative Zoology at Harvard College, vol. XXIII., Nos. 4 to 6; vol. XXIV., Nos. 1 to 5; vol. XVI., Nos. 11 and 12. Annual Report Curator, 1891-92.

———— Psyche—Journal of Entomology, vol. VI., Nos. 198 to 208.

Cincinnati, Ohio—Journal of Natural History, vol. XV., Nos. 2 to 4.

Grenville, Ohio—Bulletin Scientific Laboratories, Denison University, vol. VII.

New York—Transactions New York Academy of Sciences, vol. X., Nos. 7 to 8; vol. XI., Nos. 1 to 5.

———— Annals ditto, vol. VI., Nos. 1 to 6.

———— Journal New York Microscopical Society, vol. VIII., No. 4; vol. IX., Nos. 1 to 3.

Philadelphia—Proceedings Academy Natural Sciences, parts 1 to 3, 1892.

———— Contributions to the University Herbarium, vol. I.

Rochester—Proceedings Rochester Academy of Science, vol. II.

Salem—Proceedings American Association for the Advancement of Science, 1891 and 1892.

San Francisco—Proceedings Californian Academy of Sciences, vol. III.; Evolution of the Colors of North American Birds.

St. Louis—Missouri Botanical Gardens Report, 1892.

———— Transactions of Academy of Sciences, vol. V., Nos. 3 and 4; vol. VI., No. 1.

Washington—Bulletin of the U.S. Geological Survey; Mineral Resources of the United States, 1889-90.

———— National Academy of Sciences Memoirs, vol. V.

———— Smithsonian Institution—Report, 1890; Annual Report Bureau Ethnology, 1885-86; Report U.S. National Museum, 1890; Life Histories of N.A. Birds; Bibliography Algonquian Language; ditto Athapascan Language; Dakota-English Dictionary.

———— U.S. Department of Agriculture—Reports on Condition of Crops; Report of Secretary, 1893; Reports of Statistician; Treatment of Lumpy Jaw; Report Numbers and Values of Farm Animals; Distribution and Consumption of Corn and Wheat; Experiments with Sugar Beet and Sorghum; Agricultural Survey of Wyoming; Hawks and Owls of United States; North American Fauna, No. 7; Death Valley Expedition, part II.

VICTORIA.

Bendigo—School of Mines Annual Report, 1892.
Melbourne—Victorian Naturalist, vol. IX., Nos. 7 to 12; vol. X., Nos. 1 to 4.
———— Transactions Royal Geographical Society of Australasia (Victorian Branch), vol. X.
———— Proceedings Royal Society of Victoria, vol. IV., part 2, and vol. V.

MONOGRAPHS AND BOOKS.

Presented by the respective Societies, Museums, Governments, and Authors.

Thompson, Geo. M., F.L.S.—Notes on Tasmanian Crustaceæ, with Descriptions of New Species.
Kew Gardens, Director of—Flora Hongkongensis (Bentham).

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1893.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1857. BARKELY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, N.S.W.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1879. *MUELLER, BARON F. VON, K.C.M.G., F.R.S., M. and Ph.D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer, N.S.W., Sydney, New South Wales.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Camberwell, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1878. *HAYTER, H. H., M.A., C.M.G., F.S.S., Government Statist, Melbourne, Victoria.
1880. *KEMPE, REV. J., Hermannsburg, Charlotte Waters, South Australia.
1889. *MACGILLIVRAY, P. H., M.R.C.S., F.L.S., Bendigo, Victoria.
1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
1892. *MAIDEN, J. H., Curator Technological Museum, Sydney, New South Wales.
1888. *MASKELL, W. M., Wellington, New Zealand.
1886. NICOLAY, REV. C. G., Fremantle, Western Australia.
1880. *RICHARDS, MRS. A., Georgetown, South Australia.
1892. *SCHULZ, REV. LOUIS, Hermannsburg, Charlotte Waters, South Australia.
1883. *STIRLING, JAMES, F.L.S., Assistant Geological Surveyor, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. Adcock, D. J., Adelaide, S.A.
1874. Angas, Hon. J. H., M.L.C., Adelaide, S.A.
1887. Bagot, John, Adelaide, S.A.
1893. *Bednall, W. T., Adelaide, S.A.
1887. *Blackburn, Rev. Thomas, B.A., Woodville, S.A.
1890. Board, Gregory, Metallurgist Port Pirie Smelting Works, Port Pirie, S.A.
1884. Boettger, Otto, Adelaide, S.A.
1886. *Bragg, W. H., M.A., Professor of Mathematics University of Adelaide, S.A.
1882. Brown, L. G., Adelaide, S.A.
1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1893. Brummitt, Robert, M.R.C.S., Eng., Kooringa.
1884. Bussell, J. W., F.R.M.S., North Adelaide, S.A.
1891. Calvert, A. F., Adelaide, S.A.
1888. Chapman, R. W., M.A., B.C.E., Lecturer on Mathematics and Physics University of Adelaide, S.A.
1879. *Cleland, W. L., M.B., Ch.M., F.R.M.S., J.P., Assistant Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, S.A.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide.
1880. Cox, W. C., Semaphore, S.A.
1887. *Dixon, Samuel, Adelaide, S.A.
1876. Dobbie, A. W., Adelaide, S.A.
1893. Dudley, U., Broken Hill, N.S.W.
1890. *East, J. J., F.G.S., Registrar School of Mines, Adelaide, S.A. (Corresponding Member, 1884).
1871. Elder, Sir Thomas, K.C.M.G., Adelaide, S.A.
1886. Fleming, David, Adelaide, S.A.
1876. Fletcher, Rev. W. Roby, M.A., Kent Town, S.A.
1882. Fowler, William, Kulpara, S.A.
1889. Fraser, J. C., Adelaide, S.A.
1891. Gill, Walter, F.L.S., Conservator of Forests South Australia, Adelaide.
1880. *Goyder, George, Jun., F.C.S., Government Analyst South Australia, Adelaide.
1890. Gray, Rev. William, Tanna, New Hebrides.
1887. Grasby, W. C., Editor *Garden and Field*, Adelaide, S.A.
1861. Hay, Alexander, Adelaide, S.A.
1882. Henry, Alexander, M.D., Adelaide, S.A.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gordens, Adelaide (Corresponding Member, 1882), Adelaide, S.A.
1883. *Howchin, Walter, F.G.S., Goodwood, S.A.
1883. Hughes, H. White, Booyoolie, S.A.
1893. James, Thos., M.R.C.S., Eng., Moonta.
1891. Johnson, J., M.D., F.R.C.S., Medical Officer, Mount Gambier Hospital, Assistant Colonial Surgeon, Mount Gambier, S.A.
1853. (F) Kay, Robert, General Director and Secretary S.A. Public Library, Museum, &c., Adelaide, S.A.
1884. Lendon, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital and Children's Hospital, North Adelaide, Adelaide, S.A.
1856. Lloyd, J. S., Adelaide, S.A.

1888. *Lower, O. B., Parkside, Unley, S.A.
1885. *Lucas, R. B., Adelaide, S.A.
1874. *Magarey, Hon. S. J., M.D., M.L.C., Adelaide, S.A.
1853. Mayo, George, F.R.C.S., Adelaide, S.A.
1874. Mayo, G. G., C.E., Adelaide, S.A.
1882. *Meyrick, E. T., B.A., Ramsbury, Hungerford, Wilts, England.
1880. Molineux, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, S.A.
1859. (L) Murray, David, Adelaide, S.A.
1884. Munton, H. S., Brighton, S.A.
1893. Perks, R. H., M.D., F.R.C.S., Eng., Medical Superintendent Adelaide Hospital, S.A.
1883. Phillips, W. H., Adelaide, S.A.
1886. Poole, W. B., Adelaide, S.A.
1882. Robertson, R., F.F.P.S., Adelaide, S.A.
1885. *Rennie, H. E., M.A., D.Sc., F.C.S., Professor of Chemistry University of Adelaide.
1891. Rogers, R. S., M.D., Adelaide, S.A.
1876. *Rutt, Walter, C.E., Adelaide, S.A.
1891. Selway, W. H., Jun., Adelaide, S.A.
1886. Scott, James L., Hyde Park, S.A.
1857. Smeaton, Thomas D., Blakiston, Little Hampton, S.A.
1871. Smith, Robert Barr, Adelaide, S.A.
1882. Smythe, J. T., B.A., B.E., Inspector of Schools South Australia, Glenelg, S.A.
1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Hon. Director S.A. Museum, Hon. Surgeon Adelaide Hospital, Adelaide, S.A.
1893. *Streich, Victor, Adelaide, S.A.
1876. *Tate, Ralph, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1886. *Tepper, J. G. O., F.L.S., Entomologist S.A. Museum (Corresponding Member, 1878), Adelaide, S.A.
1856. *Todd, Sir Charles, K.C.M.G., M.A., F.R.S., F.R.A.S., Government Astronomer, Postmaster-General, and Superintendent of Telegraphs South Australia, S.A.
1889. Vardon, Joseph, J.P., Adelaide, S.A.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1883. Wainwright, E. H., B.Sc., St. Peter's College, S.A.
1878. Ware, W. L., Adelaide, S.A.
1879. Way, Edward W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, SA.
1859. Way, Samuel J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, S.A.
1882. *Whittell, Horatio, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner Adelaide, Adelaide, S.A.
1886. Wilson, John, F.E.T.S., Goodwood, S.A.
1886. *Zietz, A., Assistant Director S.A. Museum, Adelaide, S.A.

ASSOCIATE.

1893. Birks, Laurence, Adelaide, S.A.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT

For the Year ending 30th September, 1893.

In presenting their annual report the Committee are pleased to record the successful completion of the first decade of the Section's existence.

Evening Meetings.—During the year nine evening meetings have been held, at which the average attendance has been greater than that of the previous year. It was arranged that during this session the meetings of this Section and those of the Microscopical Section should be held jointly. Both Sections, therefore, now meet on the same night, and alternately provide the chief business for the evening. This union has proved very satisfactory to both Sections, and renders the meetings of greater interest, whilst economising time and expense. The annual conversazione (held in October, 1892) was again a most successful and interesting gathering, about 130 members and friends being present, and a varied programme of a scientific and social character being provided. Papers for this Section have been contributed by Dr. R. H. Perks, F.R.C.S., Messrs. J. McEwin, A. F. Calvert, M.E., J. G. O. Tepper, F.L.S., and S. Smeaton, B.A. A considerable number of exhibits in various departments of natural history have proved not the least attractive feature of the evening meetings.

Excursions.—The outdoor meetings for the practical study of natural history continue to be appreciated by the members. In consequence of the increased interest shown in this direction at the close of last year (the first excursion after the annual meeting being attended by over forty persons) a greater number were arranged during the year just closing, ten excursions having been held, as against five in the previous year. The chief feature of these excursions has been that, notwithstanding the great number held since the inception of the Section, all those of the past year have covered new ground. The longest excursion was that to

Mount Gawler (near Kersbrook), whilst the most successful scientifically were those to Happy Valley and the scrub between Gawler and Roseworthy Other interesting outings were those to Norton's Summit, Waverley, Marble Hill, and Blackwood. The Section is indebted to His Excellency the Governor, Messrs. A. T. Magarey, Wm. Milne, jun., and W. P. Phillips for hospitality, &c., in connection with the excursions.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed by the Section for the protection of our native fauna and flora shows that useful work is being performed, and that there is still plenty of scope for continued effort in this direction.

Corresponding Members.—Your Committee desire to express their thanks to the corresponding members, who still continue to evince an interest in the Section's work by sending contributions either of specimens or observations in natural history. Mrs. A. F. Richards, Georgetown, and Mr. W. Rumball, Blinman, have been the most energetic in this way. Your Committee would remind local correspondents that they are not registered as "corresponding members" until they show in a practical way their desire to be of use to the Section.

Publications.—Your Committee are indebted to the Field Naturalists' Club of Victoria and the trustees of the Australian Museum, Sydney, for kindly supplying the Section with their publications.

Financial.– The audited statement of accounts is presented herewith. The amount received from subscriptions has been a little less than in the previous year, but the expenditure has also been lower. The grant from the Royal Society has also been less than that of the preceding year.

Membership.—The number of new members this year has been just double that of last year. Twelve persons have been elected members of the Section, and sixteen names have been removed from the list on account of resignation and other causes. The number now on the roll is 93.

J. G. O. Tepper, Chairman.
W. H. Selway, Jun., Hon. Secretary.

Adelaide, 18th September, 1893.

FIFTH ANNUAL PROGRESS REPORT OF NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

In presenting their fifth annual report the Committee are pleased to be able to report further progress.

National Park.—The Committee have been glad to notice the

advance already made by the Commissioners at Belair. They trust that at an early date there will be sufficient funds to enable something definite to be done in connection with the preservation of native plants and animals.

Game Laws.—Thanks are again due to the Commissioner of Crown Lands and the police authorities for their assistance in securing the enforcement of the Game Acts. The Kangaroo Protection Act has proved of great service, and it is to be trusted that the prosecutions made thereunder will act as a warning to hunters. Two districts have been proclaimed under this statute, the first comprising the whole of Kangaroo Island, and the second the counties of Kintore, Hopetoun, Way, Dufferin, and Robinson on the West Coast. The charge of the Amending and Consolidating Game Bill drafted by the Committee has been kindly undertaken by the Hon. J. L. Stirling, M.L.C., and it is to be hoped that the measure, which has been very carefully considered, will before long become law.

Destruction of Native Flora.—It has been with much regret that the Committee have noticed the extensive destruction of native plants and more particularly ferns in our hills. Ferns are hawked about the city and suburbs to such a degree as to make it certain that unless prompt action be taken several of our gullies will shortly be denuded of some highly characteristic species. It seems to the Committee that this is a matter which can be to a certain extent dealt with by the various Corporations, and the City Council has been approached on the subject, with the result that the officials have been instructed to demand the production of a licence from hawkers. Other civic bodies will be written to in due course.

Australasian Association.—The Committee appointed at the Hobart meeting of this Association to report on the protection of native fauna includes Professor Tate, Mr. Dixon, and Mr. Robin. The reports which will be presented at the Adelaide gathering, to be held at the end of this month, will be of a thoroughly comprehensive character, and it is trusted will awaken a healthy interest in the question. In conclusion, the Committee hope that the future will be attended by further advance.

SAMUEL DIXON, Chairman.
A. F. ROBIN, Hon. Sec.

Adelaide, 18th September, 1893.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year 1892-3.

Dr. Receipts.	£	s.	d.	Cr. Disbursements.	£	s.	d.	£	s.	d.
To Balance brought forward	4	5	10	By Printing—"Proceedings" ...	6	2	0			
" Grants from Royal Society	20	0	0	General	2	5	0			
" Subscriptions	17	0	0					8	7	0
				" Conversazione				4	0	6
				" Postages and Sundries				3	18	0
				" Advertising				2	9	0
				" Attendance				1	10	0
								20	4	6
				" Subscriptions, as per contra, handed over to Royal Society... ...				17	0	0
				Balance in hand				4	1	4
	£41	5	10					£41	5	10

Audited and found correct.

J. H. C. LANGDON, THOS. EVANS, } Auditors.

Adelaide, 19th September, 1893.

W. H. SELWAY, Jun.,
Hon. Secretary and Treasurer.

MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT.

The Committee regret to still have to report that through the increasing small number of members it is very difficult to keep up an interest in the meetings of the Section. It has been found that the few members who in the past have been ever ready to contribute papers or introduce subjects for discussion are too often called upon, and when they have taken much trouble and time to work up a subject the attendance is so small as to offer little encouragement for them to continue to do so in the future.

In the early part of the year a suggestion was made by the Field Naturalists' Section that the two Sections should amalgamate, and thus secure a larger attendance at the meetings. A sub-committee was appointed to confer with a similar number from the other Section, and as a result of their report, although it was not thought desirable to altogether amalgamate the two Sections, it was decided to try having joint meetings, each taking up its own particular branch of investigation every alternate month The result has been that during the present session the meetings were much better attended, and it is hoped there has been mutual benefit from the discussion of the various papers, &c.

Three excursions have been made during the year, and were fairly attended. No new places which would reward the microscopical investigator could be found, but several new forms of pond-life were discovered.

The number of members after revision of the roll is 17, several of whom never attend the meetings. The average attendance of members during the present session has been 7.

The following were the subjects discussed at the meetings :—

1892.

Oct. 4. Demonstration on mounting opaque objects in wax cells, by Mr. E. J. Bradley.

Nov. 8. Remarks on Australian polyzoa, by Mr. W. B. Poole.

1893.

March 14. Collecting, sectioning, and mounting foraminifera, by Mr. E. J. Bradley.

May 16. Paper on external anatomy of the blowfly, illustrated by lantern slides, by Mr. W. B. Poole.

July 21. Paper on the calcareous plates of the Holuthurian, illustrated by lantern slides, by Mr. J. W. Bussell.

D. Fleming, Chairman.
J. W. Bussell, Hon. Sec.

September 19th, 1893.

MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Statement of Receipts and Expenditure for Year ending 30th September, 1893.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Subscriptions received	5	0	0	By Cash due to Secretary	0	1	0
" Grant from Royal Society for 1892	5	10	0	" Printing Reports	1	2	6
" Grant from Royal Society for 1893	5	0	0	" Magazines	1	2	6
				" Binding Magazines	0	18	0
				" Postcards and Printing same	0	14	0
				" Postage, &c.	0	7	7
				" Attendance and Kerosene	1	10	0
				" Subscriptions paid Royal Society	5	0	0
				" Balance in hand	4	14	5
	£15	10	0		£15	10	0

Audited and found correct.

C. C. PRESGRAVE, Auditor.

September 19th, 1893.

D. FLEMING, Chairman.

J. W. BUSSELL, Hon. Secretary.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

FIRST ANNUAL REPORT.

In presenting their first report the Committee of the Astronomical Section desire to congratulate their fellow-members upon the successful establishment of the society, which from the satisfactory nature of the meetings held appears to have fully justified its formation.

The existence of the society dates from the 5th April, 1892, when the first general meeting was held at the Observatory, and the following officers were elected:—C. Todd, Esq., C.M.G., M.A., F.R.S., &c., Government Astronomer, President; Messrs. W. Holden and W. Russell, Vice-Presidents; Mr. W. E. Cheesman, Secretary; Messrs. A. W. Dobbie, C. H. Harris, and Capt. Lee, members of Committee. [*Note.*—The foregoing was inserted by resolution at the annual meeting, 12th September.—W. E. Cheesman, Hon. Sec., &c.] A preliminary meeting had been held during the previous February at which 20 names were given in for membership.

The inaugural address was delivered by the President at a well-attended meeting on 14th June, 1892, since which time various papers have been given at intervals of two months by the following members:—

Construction of the reflecting telescope, by Mr. Dobbie.
Irradiation as it affects astronomical observations, by Captain Lee.
What is a comet? by Mr. Cooke.
A visit to the Royal Observatories of Greenwich and the Cape of Good Hope, by Mr. Sells.
Theory of the tides, by Mr. Kelly.
Photogrammetry, by Mr. Harris.

Abstracts of these have appeared in the daily papers.

At a Committee meeting, held on March 7th this year, the draft report and balance-sheet were submitted, and held over, pending a proposed alteration in the date of the annual meeting,

rendered necessary by the rules of the Royal Society, which require reports of Sections to be furnished on or before the 15th September in each year. This action was confirmed at the next general meeting, and the date of the annual meeting was fixed for the second Tuesday in September.

A "systematic scrutiny of the sky, for new and temporary stars," has been instituted, and our members may now feel that they are colaborating with astronomers the world over. A large chart embracing part of the Milky Way has been carefully compiled by Mr. Sells and subdivided into 33 sections, which have been allotted to members willing to keep a watch upon a small portion of the sky represented in the chart supplied to them, and to report any change or unusual appearance they may notice to the Government Astronomer.

The objects of the Section as set forth in Rule 2, viz., "The cultivation of a knowledge of the science of astronomy, and the encouragement of a popular interest in the same," are, we believe, being effectually carried out. The monthly publication of astronomical notes and their regular distribution to all members has helped very much to sustain public interest in our work.

Adopted at meeting held 12th September, 1893.

CHARLES TODD, President.
W. E. CHEESMAN, Secretary and Hon. Treasurer.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Statement of Receipts and Expenditure to 15th September, 1893.

Dr.	£	s.	d.	Cr.	£	s.	d
To Grant from Royal Society	10	0	0	By Advertisements	1	1	0
" Subscriptions, 1892	7	0	0	" Postage	3	18	0
" Subscriptions, 1893	4	15	0	" Stationery	0	15	4
" Messrs. Sells & Farr—Advertisements ...	1	1	0	" Printing Astronomical Notes	3	0	0
" Mr. Holden—Printing	0	4	0	" Printing Rules, &c.	0	5	3
" Interest, Savings Bank	0	3	8	" Ballot Box, &c.	1	0	6
					10	0	11
				" Subscriptions paid to Royal Society	7	0	0
				" Balance in Savings Bank	4	3	8
				" Balance in hand	1	19	1
	£23	3	8		£23	3	8

Audited and found correct.

E. P. SELLS, Auditor.

Submitted to the Annual Meeting, held 12th September, 1893.

September 8th, 1893.

W. E. CHEESMAN, Hon. Secretary and Treasurer.

GENERAL INDEX.

[The species and genera, the names of which are printed in italics, are described as new.]

Aboriginal Tribes of the Gulf of Carpentaria, 227 ; of the Daly River, 254.
Acidalia *didymosema*, 156.
Acrilla *leptalea*, 317.
Agriophara *leptosemela*, 174 ; *leucosta*, 173.
Alcmæonis *punctulaticollis*, 133.
Amelora *idiomorpha*, 161.
Ampullina *effusa*, 327.
Anamesia Eastii, 70 ; *Frenchii*, 72 ; *Lambii*, 70 ; *Lindsayi*, 71.
Anaxo *sydneyanus*, 134.
Anthropology of North Australia, 227, 254.
Aoplocnemis *tasmanicus*, 301.
Apirocalus cornutus, 297.
Apolita centralis, 48 ; *decorata*, 46 ; *humeralis*, 46 ; *pallida*, 46 ; pellucida, 47 ; *quadripunctata*, 45 ; vestita, 45.
Ascelis *multitudinea*, 278.
Ataxigamia Tatei, 123.
Aulicus *parvulus*, 131.
Australia, Correlation of the Marine Tertiaries of, 203.
Australian Blattariæ, 25 ; Coleoptera, new genera and species, 130, 141, 294 ; Heterocera, new species of, 287 ; Marine Gastropoda, 189, 198 ; Lepidoptera, 1, 146.
Balta epilamproides, 40 ; discalis, 40.
Basalt, Older, of Victoria, 212.
Belenois perimale, 282.
Bittium *estuarinum*, 190.
Blackburn, Rev. T. New genera and species of Australian Coleoptera, 130, 294.
Black Scale, new parasite of, 129.
Blattariæ of Australia and Polynesia, 25.
Bombyx *galactodes*, 151 ; *zonospila*, 150.
Brachysceles *Beyeriæ*, 276 ; *calycina*, 275 ; *glabra*, 278 ; munita, 273 ; *Neumanni*, 275 ; *ovicoloides*, 277 ; *regularis*, 273 ; *strombylosa*, 277 ; *subconica*, 274 ; *urnalis*, 274.
Brachyscelid Galls of S. Australia, 265.
Bullen Merri, Eocene beds at, 215.
Callidryas pyranthe, 282.
Calliostoma *spinulosum*, 195.
Calyptræa *arachnoideus*, 333 ; *corrugata*, 331 ; *crassa*, 332 ; *placuna*, 331 ; *subtabulata*, 332 ; turbinata, 333 ; umbilicata, 333 ; *undulata*, 332.
Calytropsis *arachnoideus*, 333 ; turbinata, 333 ; umbilicata, 332.
Camperdown, Eocene beds at, 215 ; fossils of, 218.
Capua *ammochroa*, 167 ; *leucopsila*, 167.
Capulus *circinatus*, 334 ; Danieli, 334.
Carpentaria Gulf, Aboriginal Tribes of, 227.
Casyra *Kershawi*, 293.
Catoryctis *polysticha*, 172.
Central Australia, Cretaceous foraminifera of, 346
Cerithiopsis *marmorata*, 190.
Cheloxena *Frenchae*, 138.
Cherrus *ocularis*, 298 ; *ruficornis*, 299.
Chlenias *genosema*, 162 ; *melanostrepta*, 161 ; *pachymela*, 162 ; (?) *rhyncophora*, 163.
Chorisoneura hygrophoroides, 114 ; *Loftyensis*, 115.
Clanculus *consobrinus*, 193 ; *euchelioides*, 192.
Cœsyra *porphyrplaca*, 181.
Coleoptera, new species and genera of, 130, 141, 294.
Columbella *vincta*, 190.
Colydiidæ, new species of, 143.
Correlation of the Marine Tertiaries of Australia, 203.
Cossus *rhytiphorus*, 147 ; (?) *polygrappa*, 148.
Cotulades *montanus*, 132.
Crepidula *dubitabilis*, 330 ; Hainsworthi, 330 ; unguiformis, 330.
Cretaceous foraminifera from Central Australia, 346
Crossea *semiornata*, 317.
Cryptarcha *depressa*, 142.
Cryptocephalus Chapuisi, 140.
Cryptophaga *aglaodes*, 171.
Cypræa Mulderi, 316.
Cyprædia clathrata, 317.
Daly River, Aboriginal Tribes of, 254.
Danais erippus, petilia, 283.
Darala *hæmoptera*, 150.
Darantasia *pachygramma*, 154.
Dasygaster *mundoides*, 152.
Delias aganippe, Argenthona, harpalyce, 282.
Dennant, J., Marine Tertiaries of Australia, 203.
Deropeltis erythocephala, 109.
Desiantha *pusilla*, 305 ; *vittata*, 304.
Diastictis *chionomera*, 159 ; *cremnodes*, 161 ; *goniota*, 158 ; *heterogyna*, 159 ; *mesombra*, 160 ; *odontias*, 158.
Dichelia *thermaterrima*, 168.
Dichromodes *strophiodes*, 155.
Dorcalis *maculatus*, 132.
Drymaplaneta communis, 110 ; *obscuripes*, 112 ; semicincta, 113 ; semivitta, 113 ; sexguttata, 113 ; *subbifasciata*, 112 ; *submarginata*, 111.
Ectobia apicifera, 35 ; livida, 34 ; lurida, 34 ; marcida, 34.
Eleutheroda gallerucoides, 116.
Emplesis *majuscula*, 311.
Empolis *Leai*, 311 ; *longipes*, 310.
Encosmia Adelaidæ, 307 ; *infuscata*, 308.

Eniopea *posticalis*, 309; *Sydneyensis*, 310; *tenebricosa*, 309.
Eocene fossils, list of, 218; strata at Mitchell River, 205; at Geelong, 205; at Muddy Creek, 205; at Spring Creek, 206; at Gellibrand River, 210; at Bullen Merri and Gnotuk Lakes, 215; at Warrnambool, 215.
Epacticus nigrostris, ruber, 306.
Epamœbus scutellaris, 312.
Epidesmia *brachygrammella*, 287; *phœdropa*, 287.
Epilampra *aspera*, 62; *atra*, 65; dilatata, 62; *Fraserensis*, 59; gracilis, 57; inquinita, 61; Kerandremii, 62; laticollis, 62: notabilis, 58; *obscura*, 64; *paula*, 60; propria, 64; truncata, 61.
Ericmodes *australis*, 141.
Etheridge, R., jun., "Mirrn-yong" heaps, 21.
Euchætis *crypsichroa*, 175; *sarcoxantha*, 176.
Euchelus *ampullus*, 197; *annectans*, 196; *fenestratus*, 195; *pumilio*, 196; *scabriusculus*, 201; *vixumbilicatus*, 196.
Euchloris *chionoplaca*, 288.
Eulechria *adelphodes*, 178; *gypsota*, 177; *lithodora*, 178; *Xanthocephala*, 177.
Euproctis *pelodes*, 150.
Euspira *effusa*, 327.
Flora of Roebuck Bay, 13.
Foraminifera of the Tarkaninna and Mirrabuckinna borings, 346.
Galls, brachyscelid, 265; list of, 271.
Gastropoda Marine, new species of, 189.
Geelong District, Eocene beds of, 205.
Gelechia *centrosema*, 171; *leucocephala*, 169; *macroplaca*, 170; *thanatodes*, 170; *thermochroa*, 169.
Gellibrand River, Eocene beds at, 210; list of fossils from, 218.
Geoscapheus robustus, 68.
Gerynassa *Andersoni*, 313; *picticornis*, 313; *simplex*, 314.
Glenelg River, Newer Pliocene beds at, 217.
Glyphipteryx *halimophila*, 183; *Lyelliana*, 182; *platydisema*, 183.
Gnotuk Lake, Eocene beds at, 215.
Goyder, G. A., on a new mineral, 127.
Grouvelle, E., on some Australian Nitidulidæ and Colydiidæ, 141.
Gulf of Carpentaria, Aboriginal Tribes of, 227.
Hednota *crypsichroa*, 166.
Hednotodes *callichroa*, 164.
Heligmope Dennanti, 328.
Heliocausta *euspilomela*, 175; *iozona*, 174.
Heterocera, new species of, 287.
Heterocrossa *mimica*, 168.
Heteroderes *cairnsensis*, 296.
Heteronympha *paradelpha*, 146.
Hipponyx antiquatus, 329; australis, 330.
Howchin, W., notes on the Tarkaninna and Mirrabuckinna borings, 346.
Ialmenus Illidgei, 8.
Iodis *rhytiphorus*, 156.
Ischnoptera *anastomosa*, 53; *annulata*, 51; australica, 50; circumducta, 51; *contraria*, 54; latirupta, 52; longiuscula, 51; *manicata*, 53; marginalis, 50; *obscura*, 54; punctuosa, 55; *paralella*, 53; patula, 52.
Knephasia medilinea, 100.
Languria Vandepolli, 140.
Lasiosticha *microcosma*, 166.
Latirofusus nigrofuscus, 198.
Lecanium testudo, new parasite of, 129.
Lepidoptera, Australian, 1, 146, 2.
Leptozosteria prima, 96.
Lichenaula *monosema*, 172.
Licymnius *bicolor*, 133.
Linosticha *chrysoloma*, 179; *dichroa*, 179.
Lithocrus *consors*, 295.
Loboptera *circumcincita*, 37; *duodecimsignata*, 36; *halmaturina*, 36; marginifera, 37; platysoma, 38; trivitta, 36; undulivitta, 37.
Lower, O. B., New Australian Lepidoptera, 146, 287; South Australian Rhopalocera, 1.
Lucia lucanus, 284.
Mackillop, Rev. D., aboriginal tribes of the Daly River, 254.
Macrobathra *isoscelena*, 182; *paracentra*, 182.
Menephilus *sydneyanus*, 132.
Mesalia *stylacris*, 341.
Microdonacia incerta, 139.
Miocene strata in Victoria, 216.
Mineral, new (stibio-tantalite), 127.
Mirrabuckinna boring, foraminifera from, 346.
"Mirrn-yong" heaps, 21.
Mitchell River, Eocene strata at, 205.
Mnesampela *dictyodes*, 291.
Mordelia *cara*, 157; *inusitata*, 136; *maculatissima*, 136; *sydneyanus*, 137.
Mornington, list of Eocene fossils from, 218.
Muddy Creek, Eocene beds at, 205; fossils from, 218; Miocene beds at, 216.
Murex umbilicatus, 198.
Natica *Aldingensis*, 326; *arata*, 324; *balteatella*, 321; gibbosa, 320; *Hamiltonensis*, 319; *limata*, 324; *Mooraboolensis*, 323; *perspectiva*, 326; polita, 325; *subinfundibulum*, 327; *subnoæ*, 320; *substolida*, 323; *subvarians*, 322; *varians*, 322; vixumbilicata, 320; Wintlei, 322.
Naticina, *vide* Natica.
Nauphœta discoidalis, 117.
Nearcha *pseudophaes*, 155.
Nephogenes *xylochroa*, 179.
Neverita, *vide* Natica.
Niphobolus deceptor, 315.
Nitidulidæ, new species of, 141.
North Australia, Anthropology of, 227, 254.
North-west Bend, "mirrn-yong" heaps at, 21.
Ogyris amaryllis, 285; idmo, 284; olane, 286.
Olbiodorus hirsutus, 302.
Older basalt of Victoria, 212.
Oniscosoma castanea, 119; pallida, 120.
Onychodes *heliochrysa*, 288.
Opisthoplatia orientalis, 66.
Orthosia *cremnodes*, 152; *mesombra*, 153.
Pachycera *catoryctopsis*, 184.
Panesthia australis, 125; Javanica, 125; morio, 124; transversa, 125.
Paracephala *cyaneipennis*, 130.
Paraphoraspis notata, 56.
Periplaneta Americana, 102; apicalis, 105; Australasiæ, 103; biquadrata, 105; concinna, 102; convexa, 106; curvigera, 104; fortipes, 106; glabra, 107; inclusa, 104; invisa, 107; ligata, 104; *obscura*, 107; oculata, 103; orientalis, 101; pallidipalpis, 105; *provisionalis*, 108; rotundata, 102; *rufa*, 101; *scabriuscula*, 108.
Perisphæria fallax, 121; laminata, 121.
Plœsiorhinus notatus, 303.
Philobota *Idæ*, 180; *pentamera*, 292; *platyptera*, 180; *porphyryantha*, 181.
Phthonerodes (?) *leucomerata*, 173.
Phyllodromia Australiæ, 42; conjuncta, 43; contigua, 44; femorata, 42; Germanica, 41; latipennis, 43; mundicola, 43; spuria, 42; suffusa, 44; vitrea, 42.

Pieris teutonia, 2.
Pileopsis navicelloides, 333.
Platydema *victoriense*, 297.
Platyzosteria albomarginata, 86; *Ardrossanensis*, 92; *armata*, 84; aterrima, 85; atrata, 85; *Avocaënsis*, 88; *balteata*, 91; *brunnea*, 86; castanea, 89; ferruginea, 94; lateralis, 93; *latizona*, 92; ligata, 93; melanaria, 83; Nova-Zealandiæ, 90; pectoralis, 95; polyzona, 94; *pseudatrata*, 86; *pseudocastanea*, 89; punctata, 85; quadrifascia, 95; *rufofusca*, 84; scabra, 88; *scabrella*, 88; subaptera, 87; tarsalis, 95; *trifasciata*, 91; truncata, 90; zonata, 94.
Plectophila *placocosma*, 292.
Pliocene (Newer) strata in Victoria, 217.
Pogonias *euryplaca*, 171.
Polynesian Blattariæ, 25.
Portland, Miocene beds at, 217.
Portulaca *dubia*, 16.
Polyzosteria ænea, 74; *Bagoti*, 79; femoralis, 77; figurata, 77; invisa, 78; *iridicolor*, 73; limbata, 73; maculata, 74; Mitchelli, 78; nobilis, 81; *obscuroviridis*, 73; *oculata*, 75; patula, 76; *pubescens*, 75; reflexa, 80; *subnobilis*, 81; subverrucosa, 82.
Pseudolampra ornata, 98; *punctata*, 97; *Rothei*, 98.
Procometis (?) *orthosema*, 173.
Pseudamanca ruficollis, 135.
Pseudopanthera *habrocosma*, 153.
Pseudoterpna *argyraspis*, 157.
Pyrameis itea, Kershawi, 283.
Rennie, Prof. E. H., poisonous constituents of Stephania, 186.
Rhopalocera of South Australia, list of, 1; notes on, 281.
River Murray, "mirrn-yong" heaps at, 21.
Roebuck Bay, flora of, 13.
Scalaria *leptalea*, 317.
Scoparia *leucomela*, 165.
Sedenia *erythura*, 165.
Selidosemæ spp., 159; *zygophora*, 289.
Sigaretopsis *subinfundibulum*, 327.
Sigaretus *microstira*, 328.
Silphomorpha *rufoguttata*, 295.
Sipho *mimeticus*, 189.
Smyriodes carburia, 164; *heterochaes*, 163.
Sorcostia *anisogona*, 149.
South Australia, brachyscelid galls of, 265; list of marine Gastropoda of, 198; Rhopalocera, list of, 1; notes on Rhopalocera of, 281.
Spring Creek, Eocene strata at, 206; fossils from, 218.
Stathmopoda *callichrysa*, 184.
Stephania hernandifolia, poisonous constituents of, 186.
Stertha *aglaodesma*, 157.
Stibaroma *plagioscma*, 291.
Stibiotantalite, a new mineral, 127.
Stigmodera *terræ-reginæ*, 295.
Stretton, W G., Aboriginal Tribes Gulf of Carpentaria, 227.
Symbothinus *puer*, 302.
Sympanotus *australis*, 144.
Tarkaninna boring, foraminifera from, 346.
Tate, Prof. R., New Australian Marine Gastropods, 189; additions to the List of Marine Gastropoda of S. Australia, 198; Marine Tertiaries of Australia, 203.
Taxeotis *gonosemela*, 154.
Temnelytra *Harpuri*, 39.
Tepper, J. G. O., on a new parasite of the Black Scale, 129; the Blattariæ of Australia, 25; S. Australian Brachyscelid Galls, 265; Flora of Roebuck Bay, 13; Notes on S. Australian Rhopalocera, 281.
Termessa *Lyelliana*, 148.
Tertiaries of Australia, correlation of, 203.
Thalaina *hieroglyphica*, 289.
Thalotia *neglecta*, 194.
Thalpochares dubia, parasite of Black Scale 129.
Thylacodes *actinotus*, 342; *Adelaidensis*, 343; *asper*, 343; conohelix, 343; *craterículus*, 342; *rudis*, 343.
Thyrsocera inquinita, 49; marginifera, 49; soror, 49.
Todima fusca, 143; *rufula*, 144.
Torcula runcinata, 199.
Torinia *foveolata*, 191.
Trichosalpingus *obscurus*, 134.
Turbo *rutidoloma*, 192.
Turner, E., Poisonous constituents of *Stephania*, 186.
Turritella *acricula*, 339; Aldingæ. 336; *conspicabilis*, 339; *gemmulata*, 338; Murrayana, 340; *pagodula*, 336; platyspira, 341; *septifraga*, 336; Sturtii, 338; *terebellata*, 336; tristira, 338; Warburtoni, 337.
Vermetus conohelix, 343.
Victoria, Eocene strata of, 203; Miocene strata, 216; Newer Pliocene, 217; Older basalt, of, 212.
Vocabulary of aborigines of the Gulf of Carpentaria, 250.
Warrnambool, Eocene beds at, 215.
Xanthophœa *filiformis*, *satelles*, 294.
Xenica achantia, 283.
Xylopertha *canina*, 131.
Xylorycta *chionoptera*, 173.
Zetobora antica, 118.
Zonopetala (?) *stenoptera*, 177.

Vardon & Pritchard, Printers, Gresham Street, Adelaide.

TRANSACTIONS

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XVIII., for 1893-94.

[With Fifteen Plates.]

INCLUDING PROCEEDINGS AND REPORTS.

EDITED BY MR. HOWCHIN AND PROFESSOR TATE.

ISSUED NOVEMBER, 1894.

Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

Royal Society of South Australia.

Patron:

HER MAJESTY THE QUEEN.

Vice-Patron:

HIS EXCELLENCY THE EARL OF KINTORE, G.C.M.G., &c.

OFFICERS.

[Elected October 2, 1894.]

President:

PROFESSOR R. TATE, F.G.S., F.L.S.

(Representative Governor.)

Vice-Presidents:

REV. THOS. BLACKBURN, B.A.

MAURICE HOLTZE, F.L.S.

Hon. Treasurer:

WALTER RUTT, C.E.

Hon. Secretaries:

W. L. CLELAND, M.B. | W. B. POOLE.

Members of Council:

SAMUEL DIXON.
WALTER HOWCHIN, F.G.S.
J. S. LLOYD.
PROFESSOR E. H. RENNIE, D.Sc., F.C.S.
W. H. SELWAY, JUN.
E. C. STIRLING, C.M.G., M.D., M.A., F.R.S.

CONTENTS.

PAGE.

STIRLING, DR. E. C.: Supplemental Note on the Osteology of *Notoryctes typhlops* 1

WILSON, PROF. J. T.: On the Myology of *Notoryctes typhlops* ... 3

FROGGART, W. W.: Notes on Brachyselidæ 75

LOWER, O. E.: On New Australian Heterocera 77

LOWER, O. E.: On Australian Rhopalocera 114

TATE, PROF. R.: On the Occurrence of *Zidora* in Australian Waters 118

TURNER, DR. A. J.: Descriptions of Australian Microlepidoptera ... 120

BLACKBURN, REV. T.: New Genera and Species of Australian Coleoptera (XV.) 139

TEPPER, J. G. O.: Supplemental Notes on the Blattariæ of Australia 169

BEDNALL, W. T.: On a New Land-shell from Central Australia ... 190

TATE, PROF. R.: Diagnoses of New Land-shells from Central Australia 191

TATE, PROF. R.: Notes on the Organic Remains of the Osseous Clays at Lake Callabonna 195

CHEWINGS, DR. CHARLES: Notes on the Sedimentary Rocks in the Macdonnell and James Ranges 197

BLACKBURN, REV. T.: New Genera and Species of Australian Coleoptera (XVI.) 200

Abstract of Proceedings 241

Annual Report 246

Balance-sheet 247

Donations to the Library 248

List of Fellows 254

APPENDICES.

Annual Report and Balance-sheet of the Field Naturalists' Section ... 257

Annual Report and Balance-sheet of the Microscopical Section ... 261

Annual Report and Balance-sheet of the Astronomical Section ... 263

Supplemental Note on the Osteology of Notoryctes Typhlops.

By E. C. Stirling, M.D., F.R.S., Hon. Director South Australian Museum.

Plate I.

In the course of an examination of the muscular system of *Notoryctes typhlops* Professor Wilson has been good enough to point out an error into which I have fallen in my description of the osteology of the manus (Trans. Royal Soc. of S.A., vol. XIV., part I.) in consequence of a small but important bone having been lost in the preparation or manipulation of the dry skeleton on which my observations were based. I take the opportunity of the publication of the first part of his paper on the "Myology of *Notoryctes*" as convenient for the correction of the error.

In the account referred to (p. 176, and Plate viii., fig. 5) I describe the pollex as consisting of two segments only, of which the proximal is attached by ligamentous connections to the metacarpal of the second digit as well as to the proximal phalanx of the latter. Being desirous of not mutilating other specimens, then as even now rare, I abstained from substantiating the existence of this obviously peculiar arrangement by reference to other dissections, but an examination of Professor Wilson's specimen as well as of another in which the bony relations have been left undisturbed leaves no doubt but that an additional carpal bone exists of which, for the reason stated, I made no mention.

In the light of this re-examination, it appears that the proximal element of the pollex is a small nodular bone about the size of a large pin's head, which articulates with the relatively large scapho-carpal. It is this bone, clearly a trapezium, which was missing in my original dry specimen (pl. i., figs. 1 and 2 *tr*). Allowing for the existence of this important element, an inspection of Prof. Wilson's specimen requires a further emendation of the constitution of the remainder of this digit as stated by me. Examination of his specimen shows that the proximal of the two segments which, by themselves in my description, constituted the pollex, shows a division into two parts—one an elongated bone articulating with the trapezium (pl. i., fig. 1, *met.* 1), the distal shorter and bearing a well-marked process radially directed (pl. i., fig. 1, *ph. prox.*). Even in Professor Wilson's specimen the division between these two bones is indistinct, and on referring to my own specimen I can find no trace of such separation, the two bones being fused into a simple segment. The radial process, however, on the distal element is clearly shown in my sketch. Lastly follows the ungual phalanx, which is less clearly shown to be a separate bone in Professor Wilson's specimen than in mine own. If, then, as seems clear, we are to

regard the proximal element of the digit as a trapezium, the scapho-carpal does not represent all the carpalia, and the pollex becomes of normal constitution, possessing its carpal, metacarpal segments and two phalanges.

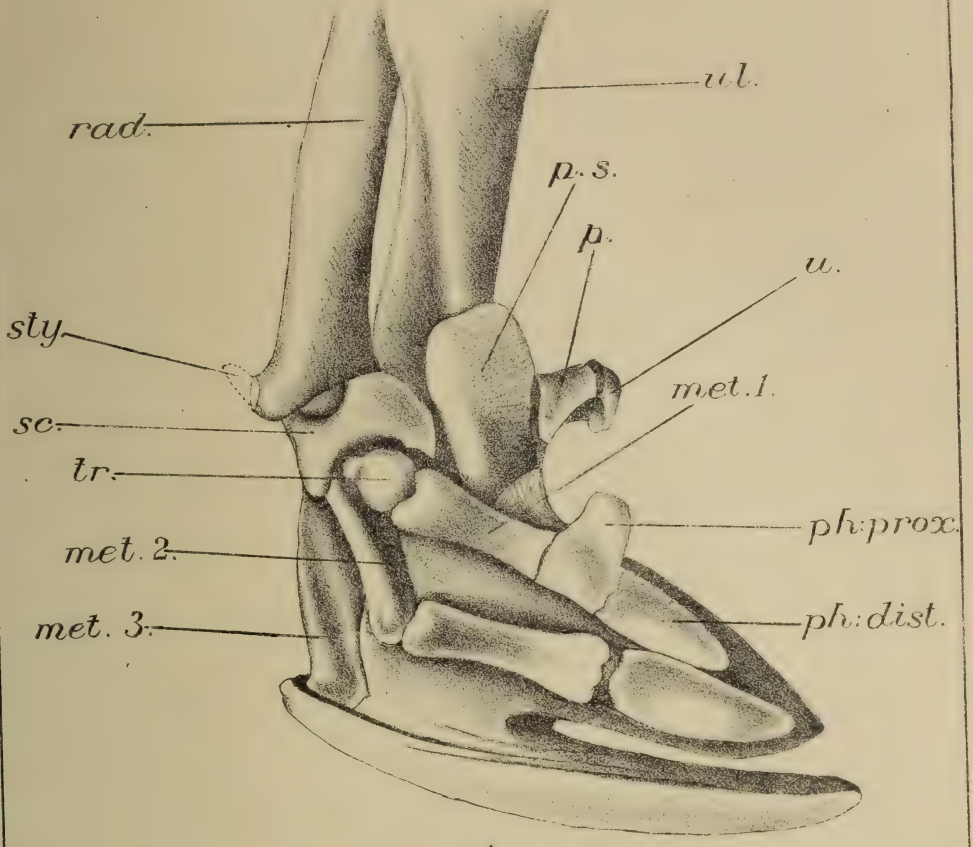
There seems, in fact, to be a marked tendency to synostosis of the bones of the manus, for in my original specimen it certainly appeared as if the elements of the fifth digit were reduced to two, a proximal, described as a metacarpal which (with the pisiform) supported the ungual phalanx. In Professor Wilson's specimen a division of this supposed metacarpal into two is certainly, if indistinctly, indicated. This arrangement, of course, provides for the fifth digit a metacarpal and two phalangeal segments. No trace of such division, however, was visible in my original specimen, or in another which I have since examined.

In the latter specimen there is complete synostosis of the ungual phalanges of the pollex and index of one manus, and almost complete fusion of their respective claws (fig. 2). On the other side no such fusion occurs. As further evidence of this tendency to synostosis in other parts of the skeleton, beyond the facts already mentioned, it is worthy of note that, in Professor Wilson's specimen, the styloid process of the radius is completely separate, whereas it is firmly ankylosed in my two skeletons. So also in the first rib he finds on one side well-marked evidence of a synchondrosis between the broad expanded sternal end and the more rod-like vertebral moiety. This is not nearly so well marked on the other side, and is not perceptible at all in my specimens. This synchondrosis evidently indicates the fusion of two distinct osseous elements, of which the ventral doubtless represents a sternal rib.

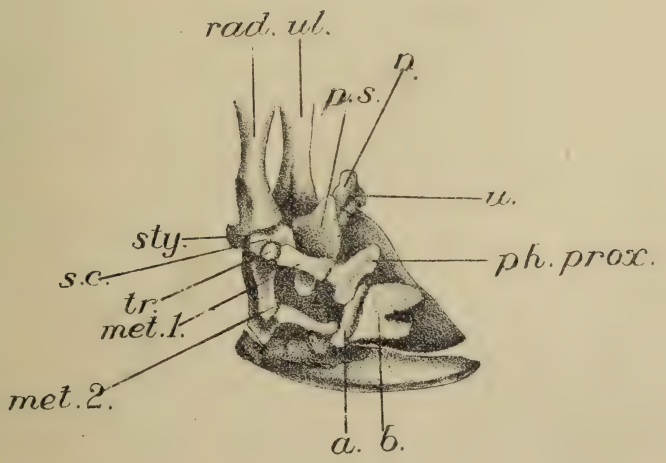
EXPLANATION OF PLATE I.

FIGURES.

1. *Notoryctes typhlops.* Right manus, palmar aspect (x 4).
   ul, ulna.
   rad, radius.
   sty, styloid process of radius (separable).
   sc, scapho-carpal.
   tr, trapezium.
   met (1), Metacarpal of pollex.
   met (2), " " second digit.
   met (3), " " third "
   ph prox, proximal phalanx of pollex.
   ph dist, distal phalanx of pollex.
   p s, palmar sesamoid.
   p, pisiform.
   u, ungual phalanx of fifth digit.
2. *Notoryctes typhlops.* Right manus, palmar aspect (another specimen).
   a, ankylosed ungual phalanges of pollex and second digit.
   b, claws similarly fused.
   Other references the same as in fig. 1.



1. (×4)



2. (×2)

G.B. del

E.C.M. Lith

On the Myology of Notoryctes Typhlops, with Comparative Notes.

By J. T. Wilson, M.B., Edin., Professor of Anatomy, University of Sydney, N.S.W.

Plates II. to XV.

Part I.

Out of the very limited number of specimens of this interesting marsupial which had come into his possession Dr. E. C. Stirling very kindly placed one at my disposal for the purpose of investigating its myology. The specimen thus obtained measured 115 mm. from the tip of the snout to the tip of the tail, the measurement being taken along the slight curve of the back. It was of the female sex. The abdominal viscera had been removed through an incision in the anterior abdominal wall.

Dr. Stirling was also good enough to afford me an opportunity of studying the partially disarticulated skeleton (imperfect) of another specimen, and this along with his own excellent descriptions and figures enabled me to acquire the necessary familiarity with the osseous system.

More recently I have been greatly indebted to Professor Baldwin Spencer, of the University of Melbourne, for permission to examine the greater part of the muscular system of another (male) specimen, a permission generously granted at the kind suggestion of my colleague, Professor W. A. Haswell.

More recently still Professor Spencer has placed another specimen at my disposal for the purpose of following out the peripheral nerves more satisfactorily than has been possible in the single complete specimen from which the following descriptions and figures have been chiefly drawn. The results of such a further examination I hope to embody in a future contribution.

I take this opportunity of thanking Mr. J. J. Fletcher for his kindness in giving me access to a number of papers and specimens in his possession, and Dr. J. Lorrain Smith, of Cambridge, for specimens kindly procured for me in England.

I also wish to express my indebtedness to Mr. G. H. Barrow, lately of the Australian Museum, Sydney, for the care and intelligence with which he has executed the drawings from which this paper is illustrated. The drawing to an accurately enlarged scale of dissections, which were often so minute as to require the constant aid of a lens, was by no means an easy task.

Incidentally, I may mention that I carefully examined the marsupium of my specimen. Its hinder limit was 8 mm. in front

of the cloacal aperture. Its interior was lined with hair opposite the vestibule of the pouch, but throughout the anteriorly directed fundus hairs were very sparsely distributed.

The fundus possessed slight lateral recesses, within which the sparse hairs were larger. The position and appearance of the mammae on the dorsal wall of the pouch opposite the entrances to the lateral recesses corresponded accurately with those recorded in Dr. Stirling's later paper in the Transactions of this Society of date October 6th, 1891.*

In view of the numerous rather anomalous features in the organisation of *Notoryctes*, and the doubts which have occasionally been expressed as to its exact systematic position and affinities, I have thought it advisable while recording the arrangements of its muscles to aim at providing for a morphological comparison between these muscles and those of other forms. This I have striven to do largely by citation from the abundant records of mammalian myology, supplemented in certain cases, more particularly in Monotremes and some Marsupials, by the results of my own examinations. Naturally, the records of the comparative myology of the *Marsupialia* have demanded the most careful scrutiny. The other orders to whose myology I have devoted some attention are the *Monotremata*, *Edentata*, *Insectivora*, *Rodentia*, and *Carnivora*.

I must, however, disclaim any idea of making an attempt at giving anything like a complete acconnt of the muscular morphology, either of these orders themselves or of individual members of them. With this important reservation, the notes may yet serve a useful purpose in illustrating the comparative anatomy of the muscles of *Notoryctes*, especially as I have paid more particular attention to those types in the various orders *(a)* whose *functional* organisation is presumably not widely dissimilar from that of *Notoryctes*—*e.g.*, *Talpa europea*—*(b)* which offer certain remarkable points of structural resemblance—*e.g.*, *Chlamydophorus*.

I greatly regret that I have had no opportunity of dissecting a specimen of that interestiug insectivore the Cape Golden Mole *(Chrysochloris)*, which would come under both of the above categories. My knowledge of the muscular anatomy of this animal has accordingly been derived from Leche's notes in Bronn's "Klassen und Ordnungen" (Sechster Band Abt. V.), which appear to have been derived from Dobson's "Monograph of the Insectivora," Pts. I. and II., to which I have been unable to refer.

In studying the myology of a specially modified member of a

---

* lv., page 286.

group, the attempt to ascertain the homologies of its muscles to those of other forms may be rendered difficult through a confusion between muscular segmentation dependent upon mere functional modification of the species and that more fundamental segmentation into muscle-fibre-groups which, while not independent of function, is yet the expression of definite morphological type.

In the section of work now presented I have not found this difficulty to offer any insuperable obstacle to a quite intelligible reading of the muscular arrangements in *Notoryctes*. In spite of its specialised structure, indeed, the muscular organisation of this animal bears very evident traces of its affinity to other more or less allied forms; and although there can be no doubt that the marsupial type is the prevalent one, there are features, for a structural parallel to which one must go outside the limits of the *Marsupialia*. And I cannot avoid the conclusion that the structural resemblances in particular to certain members of the order *Edentata* are not all to be explained as merely the coincidences of somewhat similar functional modifications, but are the enduring evidences of a real if distant morphological kinship.

Neither in *Talpa* nor, apparently, in *Chrysochloris* do we find any such striking similarities to *Notoryctes* as we do, for example, in *Chlamydophorus*; and this in spite of the fact that the habit of life of the first-named animals is probably much more like that of *Notoryctes* than is that of *Chlamydophorus*. So far as I can judge from my very limited acquaintance with the myology of *Chrysochloris*, the muscles of the anterior limb of that animal are far less like those of *Notoryctes* than at least a superficial comparison of the skeletons would lead one to expect.

M. panniculus.

The subcutaneous sheet of the *panniculus carnosus* on the ventrolateral aspect of the body consists mainly of three systems of fibres—*(a)* a platysma system ventrad of the neck and chest, *(b)* a humeral system passing transversely and obliquely outwards on the ventral aspect of the thorax and abdomen to the region of the axilla (fig. 1, *p. c.*), and *(c)* a system of longitudinal and oblique fibres crossing backwards from amongst the other abdominal fibres to the region of the marsupium which some surround, whilst others enter and end in the folds of skin forming the margin of the opening of the pouch *(sphincter marsupii)*. This system of longitudinal fibres is lost posteriorly in the region of the cloacal aperture and root of the tail, whilst its more lateral portion is continued over the front of the inguinal and femoral regions *(abdominis femoralis)*. On the dorsal aspect of the

head and neck the panniculus is inseparable from or replaced by the somewhat extensive cervico-auricularis described below.

A well-marked "*ischiotergal*" slip is attached posteriorly to the outer aspect of the ischium near its tuberosity, and passes forwards to be inserted into the skin of the back in the lumbar region. I find no record of such a specialised slip in any other marsupial, nor is it present as such in the monotremes. It is absent in *Talpa*. I have named it "*ischiotergal*" after an apparenly similar slip described by Macalister* in *Tatusia*.

The comparatively meagre development of the panniculus stratum in *Notoryctes* is worthy of remark. In its degree of development and differentiation it is slight, slighter than is usual amongst marsupials, and far inferior to the corresponding stratum in monotremes and insectivores, in which an extensive development of the sheet is found, *e.g.*, in *Ornithorhynchus* or in *Talpa* or *Chrysochloris*—animals which are just as destitute of special dermal movable structures.

Some of the *Edentata*, *e.g.*, most Armadilloes, have well-developed skin muscles, but in others, and especially in *Chlamydophorus*, the sheet is only feebly developed, and not well differentiated.

M. cervico-auricularis (figs. 1, 4, and 5 *r.a.*) is a well marked sheet of muscle, extending from the mesio-dorsal line of the head and neck outwards to the distal end of the long tubular auditory meatus, into the dorsal aspect of which it is inserted, its anterior fibres mingling with those of the special attrahens aurem (figs. 2 and 3*q*). Its anterior border reaches the parietal and frontal regions, whence its fibres are directed backwards and outwards, converging to the meatus. Anteriorly it is closely related to the integument of the scalp, while its transverse posterior border behind the occiput is free.

It overlaps the whole of the cleido-trapezius and delto-trapezius elements of the subjacent sheet. Many of its fibres have an almost antero-posterior direction, and a decussation of these with the transverse fibres is observable.

M. attrahens aurem seu mandibulo-auricularis, a narrow, ribbon-like muscle (figs. 2 and 3*a.a.*), arising from the lateral aspect of the ascending ramus of the mandible, just behind the insertion of the temporal muscle, by a narrow tendinous origin, which is overlapped by the hinder border of the masseter. Its fibres are directed outwards and dorsally, parallel with, and close in front of, the tubular auditory meatus, to the distal extremity of which some of its fibres are inserted, the remainder decussating and mingling with the fibres of the cervico-auricularis.

Cervico-auricularis seems to be the representative of conjoint attollens and retrahens aurem muscles, at least, and part of it corresponds to the auriculo-occipitalis of Ruge.

---

* xxvii., page 227.

Not unlikely, it also represents other cervical and cephalic portions of the panniculus, *i.e.*, elements of the "subcutaneus colli" layer of the "superficial brachio-cephalic stratum" of Humphry*.

In *Myrmecobius* Leche† describes two layers of auriculo-occipitalis fibres, of which the deeper were directed forwards from the ligamentum nuchae towards the anterior basal part of the ear, and partly to the upper orbital border, while the more superficial fibres passed directly outwards from the mid-occipital line to unite with the other fibres in the auricle.

In *Phascogale* the same observer describes an auriculo-occipitalis consisting of several slips, of which the anterior passed forwards into the frontal region beneath the auricularis superior, while three slips passed transversely outwards to the auricle.

It may be that the hinder part of the M. auricularis superior of this animal‡ is represented by part of the anterior fibres of the cervico-auricularis of *Notoryctes*.

Attrahens (mandibulo-auricularis) present in both the above animals.§

In Koala|| Macalister found a thin and wide attollens and a strong bilaminar retrahens, which came from the occipital protuberance. He also found two attrahens slips, neither of which, however, corresponds to the mandibulo-auricularis of *Notoryctes*.

In *Ornithorhynchus* the ear muscles are not fully differentiated from the cephalic prolongation of the panniculus.¶

In *Chlamydophorus* Macalister** found the ear muscles exceedingly feeble, the attollens and retrahens being hardly represented, while in *Tatusia* the same author found both well developed. The *attrahens* in the former animal was also feebly devoloped, and arose from the zygomatic arch.

Humphry found in *Orycteropus*†† a large retrahens, continuous with an attollens, all the fibres converging to the ear, and an attrahens arising by three origins, of which the first exactly corresponds to the origin from the mandible in *Notoryctes*.

Auricular muscles in the Insectivora are well developed in accordance with the great specialisation of the subcutaneous muscles generally. Both in *Chrysochloris* and the *Talpidae*‡‡ they include occipito-cuticularis and cervico-auricularis sheets, both of which are inserted into the auricle; and a cervico-cuticularis may also in part *(Gymnura)* possess a similar attachment.

That muscular system or stratum of fibres which in man is represented by the *trapezius* and *sterno-cleido-mastoid* muscles, with occasional intermediate slips, consists, according to Macalister,§§ of the following elements:—"*Trapezius, acromio-trachelien, cleido-occipital, cleido-mastoid, sterno-mastoid*, &c."

Only the trapezial and sterno-mastoid portions are with certainty present in *Notoryctes*, but the trapezial system of fibres

---

* xx., page 133. † xxvi., page 674. ‡ xxvi., page 678, and Taf. xcviii., fig. 2. § xxvi., page 683, and Taf. xcviii., fig. 2. || xxviii., page 128. ¶ xxxvii., Tab. vi. ** xxvii., page 229. †† xxi., page 295. ‡‡ xxvi., pages 663 and 679. §§ xxvii., page 238.

consists of the following recognisable elements:—1, *M. cleido-trapezius* (figs. 1 and 3 *c.t.*); 2, *M. delto-trapezius* (fig. 1 *d.t.*); 3, *M. acromio-trapezius* (figs. 1, 4, and 5 *a.t.*); and 4, *M. spino-trapezius* (figs. 1, 4, and 5 *s.t.*).

Of these, the first two are semi-conjoint (figs. 4 and 5 *c.d.t.*), while the last two are distinct muscles (figs. 1, 4, and 5, *a.t.* and *s.t.*).

The first, preaxial and ventral, segment or *cleido-trapezius*, is separated by a preclavicular, narrow, triangular area from the sterno-mastoid muscle (figs. 2, 3, and 5 *s.m.*). It is only separate from the second, or delto-trapezius, for a short distance in front of, and ventral to, the shoulder. The conjoint muscle arises from part of the *crista lambdoidalis* or *occipitalis*, described by Stirling* as "running forwards and outwards, and then downwards from the occipital tubercle till it becomes continuous with the upper edge of the zygoma." This ridge in its outer vertical part bounds the temporal fossa posteriorly, whilst its horizontal inner part, forming the "superior curved line," or nuchal crest of the occiput, gives origin to the muscle under notice as far forwards as the temporal fossa. It also arises from the ligamentum nuchæ for 3 or 4 mm. backwards from the occipital tubercle. The fibres are at first directed transversely across the neck, covered by the cervico-auricularis. Just behind the auricle the fibres sweep backwards, becoming at the same time segmented into the two component parts (figs. 2 and 5, *c.t.* and *d.t.*).

The ventral, or cleido-trapezial, part now courses beneath the shoulder backwards to its attachment to the clavicle, not far from the meso-scapular extremity of that bone (fig. 3, *c.t.*).

The delto-trapezial, more dorsal moiety ("trapezio-deltoid," "cephalo humeral muscle") covers the ventral aspect of the acromion and meso-scapular segment (also overlapping the distal half of the acromion laterally), and is then continued on, between the scapulo- or spino- and cleido-deltoids, becoming more or less united with them, towards a common insertion.

M. acromio-trapezius (figs. 1, 4, and 5, *a.t.*) forms a transverse, almost rectangular, band of fleshy fibres, whose anterior border is closely related to the posterior border of the preceding muscle, arising mesially from the ligamentum nuchæ immediately behind the delto-trapezius, and extending as far back as the first dorsal spine, where it ends, leaving a free hinder margin. Its fibres pass laterally, to be inserted into the dorsal surfaces of the meso-scapular spine and the proximal half of the acromion, partly concealing the attachment to the pre-axial lips of the same parts, of the extensive subjacent rhomboideus (figs. 1 and 4 *rh.*).

---

* liv., 162.

M. spino-trapezius (figs. 1, 4, and 5, *s.t.*), the caudal sector of the trapezial system, is separated by a considerable gap from the preceding, and, in the interval between them, portions of the Mm. latissimus dorsi and rhomboideus come into view. It arises from the tips of the spines of the seventh to the eleventh dorsal vertebræ (inclusive), and from the supra-spinous ligament, and it forms an elongated ribbon-like band, directed obliquely forwards and outwards, to be inserted into the post-axial lip of the scapular spine, chiefly into a prominence of the same, which overhangs the post-scapular fossa.

This strap-like muscle crosses the latissimus dorsi obliquely, and is supplied from the brachial plexus via the axilla, and posterior to the scapula, by a nerve, which also supplies the latissimus dorsi.

This entire separation of the posterior segment of the trapezius sheet, both in origin and insertion, from the more anterior fibres, is quite unusual amongst marsupials; in fact, I have neither observed, nor found any record of, such an arrangement in any other member of the order.

The *trapezius* indeed in marsupials generally forms, as stated by Cunningham* for the three forms described by him, "an unbroken muscular sheet," at least so far as the origin is concerned. Macalister,† however, reports, that in *Sarcophilus* "the part of the muscle corresponding to the root of the spine of the scapula was weak and tendinous, and nearly divided the fleshy part into an upper and a lower trapezius; however, a thin muscular margin near the spines of the vertebræ saved it from this division."

In the Monotremes‡ the posterior part of the muscle is quite separated from the anterior by a wide gap, the posterior part of the trapezius arising from the hinder ribs and vertebræ, and running forward to be inserted into the "anterior" or spinous border of the scapula near its basal end. (In *Echidna* also into the dorsal border.)

A similar isolation of the posterior occurs in some of the *Edentata*, notably in *Chlamydophorus*§ and in the armadillos generally.‖ It arises in *Chlamydophorus* from the anterior dorsal vertebræ, and is inserted into the scapular spine.

The division is universal in the *Insectivora*,¶ the hinder part (spino-trapezius) being inserted into the posterior end of the scapular spine.

Mivart and Murie** describe the division also in the Agouti, where it is also figured by Cuvier and Laurillard,†† and it occurs in other rodents, *e.g.*, the Rabbit.

I find on dissection that the spino-trapezius in *Talpa* is innervated *via* the axilla, as in *Notoryctes*.

A tripartite division of the trapezius sheet exists in the cat,‡‡ in *Ursus americanus*,§§ and in *Hyæna*,‖‖ and in the *Carnivora* generally the spino-trapezius is differentiated.

---

* iv., page 2. † xxix., page 154. ‡ xxxvii., page 23, and vi. Pl., 265. fig. 2, and xxxix., page 379, and lxii., page 12. § xxvii., page 234. ‖ lvi., page 92. ¶ xxvi., page 720. ** xl., page 393. †† vi. Pl., 245. ‡‡ lxiii., page 212, and lvi., page 93. §§ lvi., page 93, and vi. Pl., 81-2. ‖‖ vi. Pl., 129-30.

In the Cat the three sectors correspond to the cleido- acromio- and spino trapezius of *Notoryctes* (*i.e.*, the clavo-acromio- and dorso-cucullaris of Strauss-Durckheim). The fibres I have named "delto-trapezius" are simply "cephalo-humeral" fibres belonging to the claricular system of trapezius fibres.

I am doubtful whether the segment described above as cleido-trapezius is or is not to be regarded as the equivalent of a cleido-occipital. A muscle corresponding to the latter is otherwise absent, but a cleido-trapezius very like that in *Notoryctes* occasionally co-exists with a true cleido-occipital, *e.g.*, in Koala,* Cuscus,† *Phalangista vulpina*,‡ amongst other marsupials.§ The origin of the trapezius sheet in this order varies chiefly in the number of dorsal spines which give it origin, *e.g.*, from all in *Dasyurus*, or only from seven in *Thylacinus*, *Phascogale* and Cuscus, and nine or ten in *Sarcophilus*. It arises from the occipital crest, and ligamentum nuchæ also in most. Its insertion is in all marsupials mainly into the spine or spine and acromion, but the anterior fibres have a variable insertion, and often wholly *(Dasyurus)* or partly *(Phalangista)* form a cephalo-humeral bundle passing, to be inserted along with deltoid, like the delto-trapezius in *Notoryctes*.

In Wombat this anterior part passes over the clavicle and replaces the clavicular part of deltoid, while again in *Sarcophilus* no part of the muscle reaches the humerus, the anterior fibres being inserted into the outer fourth of the clavicle.‖

Macalister's view (adopted by MacCormick for *Dasyurus* and *Phalangista)* that the humeral fibres of the *trapezius* in *Phascolomys* correspond to those of the "cephalo humeral" muscle found in other orders is opposed by Leche¶, but, as it appears to me, on quite insufficient grounds. His argument that in *Dasyurus* and *Myrmecobius* there is a "pars clavicularis deltoidei" independently of the humeral trapezius is sufficiently answered by reference to the conditions in *Phalangista*** and *Phascolomys*, where a part or the whole respectively of the clavicular deltoid is replaced by what are plainly fibres corresponding to the humeral fibres of the trapezius in *Dasyurus*. One need only suppose that the pars clavicularis deltoidei in the latter animal, which is concealed by the humeral slip of the trapezius, answers only to the deeper part of the whole clavicular deltoid.

No corresponding segmentation of the anterior part of the trapezius is present in Monotremes.

In *Echidna*†† the muscle is inserted into part of the dorsal border of the scapula, along the scapular spine, by means of a fibrous arch, and to the acromion and outer part of clavicle. In *Ornithorhynchus* it is inserted into the dorsal scapular margin and the clavicle and inter-clavicle.

Macalister,‡‡ after describing a cleido-occipital in *Chlamydophorus*, and stating that "in no other Edentate does this muscle seem to exist distinctly," goes on to say, "Professor Hyrtl describes a third muscle external to the cleido-mastoid, but much stronger, which ascends with it, and is inserted into the lambdoid suture, and into the temporal

---

* lxxii., page 222. † iv., page 4. ‡ xxxvi., page 104. § vi. Plate, 174 *a*+, and Plate 176, fig. 1., *a*+. ‖ xxix., page 154. ¶ xxvi., page 719. ** xxxvi., fig. 7 *tr.*, and vi. Pl., 177. †† lxii., page 12. ‡‡ xxvii., page 238.

aponeurosis; this he regards as the separated clavicular trapezius. This muscle was inseparately joined to the rest of the trapezius in mine," &c. The last described portion of the trapezius would appear to correspond to the cleido-trapezius of *Notoryctes*.

The insertion of the anterior trapezius in *Chlamydophorus* and *Tatusia* is into the scapular spine and acromion.

M. rhomboideus (figs. 1 and 4, *rh.*) is a single, very extensive, and thick muscular sheet. It arises in part from the crista occipitalis under cover of the cleido- and delto trapezius, but it extends further ventro-laterally than they do. It also takes origin from the whole of the ligamentum nuchæ under cover of delto- and acromio-trapezius fibres, and from the first two dorsal spines where it is uncovered by any other muscle. Its posterior border is parallel and in apposition with the anterior border of the latissimus dorsi. The fibres of the muscle have a somewhat complicated arrangement. The posterior ones run directly outwards, to be inserted into the vertebral or mesial border of the scapula, The fibres next succeeding (anteriorly) incline slightly backwards, whilst those from the cephalic end of the ligamentum nuchæ, together with the whole of the occipital fibres, sweep almost directly backwards. Of the backwardly-directed fibres, those more dorsally placed are inserted into the vertebral border of the scapula, but less into its mesial *edge* than into the outer surface, or dorso-lateral lip; whilst the more ventrally placed, occipital, fibres are inserted into the preaxial lip of the scapular spine under cover of the acromio-trapezius. (See fig. 4.)

The rhomboideus muscular stratum in *Notoryctes* plainly contains elements of all three portions recognised in certain other forms, *i.e.*, Mm. rhomboideus capitis, rhomboideus major, and rhomb. minor.

For a list of synonyms for the rhomb. capitis reference may be made to Leche's Memoir in Bronn's Thier-reich*

The rhomboid sheet in *Notoryctes* differs from that described in other marsupials, *e.g.*, by Cunningham,* chiefly in the much greater extent of its insertion, which has usurped the whole length of the preaxial lip of the mesoscapular spine. This fact, together with the entire absence of an acromio-trachelien muscle, leads me to suppose that the latter muscle has been absorbed into the rhomboideus, or, rather, has not been segmented off from it. But there is no atloid origin of part of the sheet to indicate such a compound character.

In Cuscus, *Phascogale*, and *Thylacine*†, in Koala‡, and in Wombat§ the rhomboid is undivided and extensive, arising from occipital crest as well as from cervical and dorsal spines, and in all is inserted into the whole length of the base of the scapula; and in each of these animals an acromio-trachelien is present attached, in Wombat, to "outer half of scapular spine," and in Koala, to "one-half of scapular spine."

* xxvi., page 725. † iv., page 3. ‡ xxviii., page 129. § xxix., page 154.

In *Phascogale** the acromio-trachelien is double, and attached to whole length of scapular spine, the "superior" muscle being united with the margin of the rhomboideus by its upper margin, so that the latter muscle is inserted "to a small extent into the root of the scapular spine." A similar fusion also occurs in *Myrmecobius*.† In Cuscus the acromio-trachelien is also double, and distinct from the single rhomboideus. In *Thylacine* it is single and distinct. In *Sarcophilus*‡ the rhomboideus is distinct from the acromio-trachelien, and is itself divided into "a rhomboideus occipitalis (*i.e.*, capitis), and a proper rhomboid made up of the fused major and minor."

In *Dasyurus viverrinus* and in *Phalangista vulpina* MacCormick§ found the rhomboid extensive and undivided, and inserted into the whole length of the base of the scapula, and also that it "has a small slip inserted into the anterior lip of the spinal crest of the scapula close to the base of the bone above the acromio-trachelien superior, and in a line with it."

Both in *Ornithorhynchus* and *Echidna* the rhomboid is undivided, thick, and strong, its origin reaching in the former from the occipital crest of the dorsal region. In both forms it is inserted into the greater part of the scapular base. Cuvier and Laurillard‖ figure an acromio-trachelien in *Ornithorhynchus* which consists of two distinct parts, described by Meckel¶ under the name of levatores scapulæ. The dorsal part is inserted into the scapular base, the other into acromion and clavicle. Mivart notes the same double muscle in *Echidna* under the name of levator-claviculæ**; also Westling.††

Macalister‡‡ states that in *Dasypus* the acromio-trachelien is supra-occipital in its origin, that in *Pholidotus* it is united with the occipital rhomboid, and that it is absent in *Chlamydophorus*, *Tatusia*, *Cyclothurus*, *Bradypus*, *Choloepus*, in the first two of which the occipital rhomboid extends along the meso-scapular spine.

In reference to the acromio-trachelien muscle, the latter author remarks that "the exact relationship of this muscle to the other shoulder muscles is not very clear; in the largest proportion of mammals it is present, and is atlantic in origin and acromial in insertion, occupying a position beneath the front edge of the trapezius, but most probably, as suggested by many authors, it is a slip of the superficial muscular sheet intermediate between the trapezial and cleido-occipital factors of that expansion. The elements of this sheet seem thus to be trapezius, acromio-trachelien, cleido-occipital, cleido-mastoid, sterno-mastoid," &c. In some cases at least I think we must rather associate the acromio-trachelien with the deeper rhomboid stratum with which it is sometimes (*Pholidotus*) evidently fused, and with a greater extension of which its absence is occasionally associated (*Notoryctes*, *Chlamydophorus*). This relationship is well expressed by Cuvier's appellation of "dorso-trachelien" for the three rhomboid factors and "acromio-trachelien" for the usual omo-atlantic muscle. Leche regards it as akin to the levator-scapulæ group.§§

In *Chrysochloris*‖‖ the acromio-trachelien is present as a double

* iv., page 3. † xxvi., page 726. ‡ xxix., page 154. § xxxvi., page 106. ‖ vi. Pl., 266, fig. 2. ¶ xxxvii., page 23. ** xxxix., page 383. †† lxii., page 13. ‡‡ xxvii., page 238. §§ cf. xxvi., 732. ‖‖ xxvi., page 727 and 733.

muscle, inserted into mesoscapular spine and metacromion. Here the rhomboid stratum is bilaminar, the superficial lamina extending from crista occipitalis and ligamentum nuchæ to posterior angle of scapula and the deeper from occipital crest to dorsal part of spine of scapula. The part corresponding to the minor rhomboid, however, does not share in this delamination, but is separately segmented off posteriorly, and joins with its fellow of the opposite side to form a muscular band passing between the posterior scapular angles of opposite sides.

In *Talpa* there is only one rhomboid muscle, "probably the representative of the rhomboideus minor of man."*

In most other *Insectivora* the rhomboid consists of two parts—anterior corresponding to rhomboid cap. and rhomboid major, and posterior corresponding to rhomboid minor. Acromiotrachelien is generally single and inserted into acromion or metacromion, in Tenrec and Hedgehog along with trapezius.†

In Agouti, Mivart and Murie‡ describe only "one continuous sheet of rhomboid muscle arising from the paramastoid process of the occiput, the median line of the neck, and the dorsal vertebræ." So also in *Hystrix*.§

In other rodents the three rhomboid elements are usually present and distinct.

Acromiotrachelien in the Hare‖ is inserted with the humeral fibres of the trapezius, and in Agouti¶ in addition partly into the aponeurosis of the arm.**

Amongst the *Carnivora* the rhomboid sheet may have the three factors represented as a single sheet (*Procyon*), or they may be distinct.

In the Dog and others the occipital portion seems to be absent.††

The acromiotrachelien is often inserted with the trapezius, and frequently passes backwards crossed by the cephalo-humeral muscle, to be inserted into the acromion close to or beneath the acromial part of the trapezius.†† It is double in *Cercoleptes*.§§

M. sternomastoideus (figs 2, 3, and 5 *s.m.*) takes origin from the anterior projection of the presternal rostrum, and forms a rounded or prismatic fleshy mass inserted into the mastoid region of the skull just above the external auditory meatus and under cover of the parotid gland.

The fibrous continuation of the imperfect clavicle passes inwards to the presternal rostrum just dorsad of the origin of the muscle. The muscles of opposite sides are in partial contact close to their origins.

No cleido-mastoid element is present, though such is present in all other marsupials; and, as already mentioned,‖‖ the cleido-occipital, common to all other marsupials, is likewise absent unless the fibres I have named *cleido-trapezius* are to be regarded as such.

---

* xi., page 212. † vi. Pl., 75, fig. 1, and Pl., 77, fig. 2. ‡ xl., page 393. § xxvi., page 728. ‖ vi., Pl., 232. ¶ vi., Pl., 245. ** Cf., also vi. Pl., 240 and 249. †† ix., page 180. ‡‡ vi. Pl., page 109. §§ l., page 547. ‖‖ Supra.

In *Ornithorhynchus* the sterno-mastoid is double, one portion being placed beneath the other.* Neither cleido-mastoid nor cleido-occipital are segmented off from the sterno-mastoid-trapezius system in either of the monotreme forms.† In *Echidna* the sterno-mastoid has an extensive origin from the ventral face of the median bar of the interclavicle, the presternum, and a large part of the meso-sternum. Its origin covers part of the origin of the pectoralis major. The origin, as I have found it, is thus more extensive than Mivart describes it; nor did I find it so narrow as he did.

A cleido-mastoid is present in *Chlamydophorus*,‡ *Tatusia*,‡ *Dasypus*,§ *Orycteropus*,‖ and amongst other *Edentata*, though it is not invariably present, while the cleido-occipital is frequently absent in this order, though present in *Chlamydophorus* and some others.¶

Both sterno- and cleido-mastoids are usually present in *Rodentia Insectivora* and *Carnivora*, though the segmentation of the cleido-mastoid from the sterno-mastoid is frequently incomplete. A cleido-occipital, too, is generally developed, but its relations are often modified by the partial or complete suppression of the clavicle, when it may enter, with the clavicular deltoid, into the formation of a cephalo-humeral muscle. It is very frequently, wholly or partially, fused with the cleido-mastoid, or in some forms with trapezius.

I cannot find any instance in these orders of entire absence of both cleido-mastoid and cleido-occipital.

M. deltoideus (figs. 1-5, *d.t.*, *c.d.t.*, *c.d.*, and *s.d.*) consists of two distinct sectors, in addition to the delto-trapezius already described (trapezio-deltoid). The latter occupies a position intermediate between the other two in its course distally towards the humerus, and in its course it crosses and covers the insertion of the subclavius into the mesial border of the "meso-scapular segment."

The clavicular portion of the deltoid *(M. cleido-deltoideus)*, figs. 3 and 7, *c.d.)* is comparatively small, and arises from the outer or lateral third of the clavicle, and thus corresponds to the insertion of the cleido-trapezius. It covers part of the subclavius muscle.

The scapular portion of the deltoid (*spino-* or *acromio-deltoid* figs. 1-5, *s.d.*) takes origin from the outer or lateral borders of the acromion and meso-scapular segment, and from the entire length of the post-axial lip of the true scapular spine (meso-scapula), the posterior fibres lying in the sulcus between the scapular spine and the broad scapular head of the triceps muscle (fig. 2, *tr.*). This part of the muscle is crossed by the ribbon-like spino-trapezius.

All three sectors of the muscle (including the delto-trapezius) are inserted into the proximal tubercle and mesial border of the elongated delto-pectoral tuberosity of the humeral shaft.

---

* xlv., page 5. † xxxix., page 381. ‡‡ xxvii., page 232. § xiv., page 527. ‖ xv., page 571. ¶ xxvii., page 232.

This arrangement of the fibres of the deltoid series closely resembles that figured by Cuvier & Laurillard in *Phalangista*,* and described in *P. vulpina* by MacCormick.† It is thus of the bipartite variety, the scapular deltoid not being segmented into acromial and spinous portions.

The muscle is unsegmented in the Giant Kangaroo (Macalister and Cuvier & Laurillard) *Macropus minor* (C. & L.), *Macropus Bennettii*, and *Didelphys* (Macalister).‡ It is bipartite in Cuscus and *Thylacinus*,§ as well as in the Vulpine Phalanger, as already mentioned; also in the Wombat,‖ and in Koala according to Young,¶ though according to Macalister** it consists of "three parts inseparably united" in the latter animal.

It is tripartite in *Phascogale*,†† and in *Dasyurus viverrinus*.‡‡ In *Sarcophilus*§§ the spinous and acromial portions of the scapular deltoid are separate, but there is "no clavicular deltoid separate from the outer fibres of the acromial portion."

In *Perameles* an accessory slip from the inferior costa of the scapula is present according to Owen.‖‖

The deltoid in *Ornithorhynchus*¶¶ is generally regarded as single and scapular, though Owen*** follows Meckel††† in regarding as an anterior part of the deltoid that deep ventral muscle which Mivart‡‡‡ has named "epicoracohumeral" in *Echidna*. Cuvier and Laurillard figure the latter muscle§§§ as a middle or lesser pectoral.

In *Echidna*, Mivart‖‖‖ describes and figures a double deltoid; one portion is scapular, and corresponds to that in *Ornithorhynchus*, while the other is claviculo-acromial, and corresponds in position and attachments to a muscular sector, which seems to constitute the most anterior division of the pectoralis major in *Ornithorhynchus*.

Westling,¶¶¶ in remarking upon this correspondence, raises the question for future decision whether in *Ornithorhynchus* we have a fusion of originally distinct muscles, or whether the condition in this animal is primary, the anterior part of the deltoid in *Echidna* having arisen as a secondary differentiation from the pectoralis major.

Westling states that the two muscles are certainly homologous, corresponding in origin, position, and innervation. Working in this laboratory, my friend and former pupil, Dr. W. J. McKay, has satisfied himself of this homology, and is strongly inclined to the belief that the sector in question in *Ornithorhynchus* in reality belongs to the deltoid system, and not to the pectoral. He finds that it corresponds accurately in postion and attachments to the "anterior deltoid" in *Echidna*, and as in the latter animal it splits at its insertion to enclose, or rather it is folded round, the tendinous insertion of the posterior deltoid. Again, he confirms Westling's statement in reference to the innervation of the muscle. As in *Echidna*, so in *Ornithorhynchus*, it is supplied exclusively by the "nervus axillaris," which also supplies the posterior deltoid in both animals. The anterior thoracic nerves which

---

* vi. Pl., 177, fig. 2, and Pl., 179, fig. 1. † xxxvi., page 115. ‡ xxix., page 159. § iv. ‖ xxix., page 159. ¶ lxxii., page 226. ** xxviii., page 130. †† iv., page 9. ‡‡ xxxvi., page 115. §§ xxix., 159. ‖‖ xlv., page 11. ¶¶ xxvi., page 791, and vi. Pl., 265, fig. 2. *** xlv., page 6. ††† xxxvii., page 26. ‡‡‡ xxxix., page 384. §§§ vi. Pl., 266, fig. 2. ‖‖‖ xxxix., page 384, Pl. 52, fig. 2. ¶¶¶ lxii., page 17.

supply the true pectoralis fibres send no filaments to this muscular mass, and the only other nerve in relation to it is a cutaneous branch of the N. supra-coracoideus (peculiar to Monotremes) which pierces the muscle, but, *contra* Westling, *without* supplying twigs to it.

In *Chlamydophorus** the deltoid is tripartite, with clavicular, acromial, and spinous sectors, as is the rule amongst the *Edentata*. The clavicular deltoid may, however, be absent, as in *Bradypus*.† or it may be rather small, as in *Chlamydophorus*. In *Bradypus* the acromial and spinous portions are fused.

In the Paca‡ a clavicular deltoid is separated from an imperfectly divided acromio-spinous sector by a prolongation of the acromio-trachelien. A similar clavicular muscle-segment with imperfectly separated acromial and spinous portions was found by Mivart and Murie in Agouti and other rodents,§ but they consider the clavicular fibres to form part of the pectoralis major.

In the Hedgehog‖ the deltoid is distinctly tripartite, the acromial and spinous portions being separated by the insertion of the acromio-trachelien. Leche,¶ however, refers to it as single.

In *Talpa* the scapular (spinous) portion is absent, according to Meckel** and Freeman.††

In *Gymnura*‡‡ the clavicular portion is absent.

In *Chrysochloris* the muscle arises from clavicle and metacromion.

In the Cat, and apparently in the *Carnivora* generally, the clavicular deltoid is practically continuous with the cleido-trapezius forming the cephalohumeral muscle. Acromio- and spino-deltoids are also present, so that the muscle is here generally tripartite.

M. *latissimus dorsi* (figs. 1, 2, 6, and 7) resembles in general shape the muscle in the human subject. It is crossed by the spino-trapezius.

Its origin is from the dorsal spines from the 3rd to the 12th (inclusive). There are no costal origins. Its fibres converge laterally and anteriorly towards the axilla, where, at the hinder border of the massive triceps, they ultimately form a thick prismatic fleshy mass partly overlapped by the latter muscle. The latissimus is entirely destitue of a humeral insertion. Lying just posterior to the triceps, it enters the forearm, halfway down which the fleshy fibres end abruptly in the aponeurosis of the forearm, which is thus greatly strengthened, forming a dense layer on the surface of the flexor carpi ulnaris. The aponeurosis may be traced down to the manus. The insertion thus corresponds to one form of a dorso-epitrochlearis insertion, which is not otherwise present, and probably we ought to regard the two muscles as fused, or rather as unsegmented from one another. No trace of such a fusion in the form of a tendinous intersection was present. The muscle is quite unconnected with the teres major, but opposite the olecranon its fibres run just parallel to

* xxvii., page 243. † xxxii., page 56. ‡ vi. Pl., 249, fig. 2, and Pl., 251, fig. 1. § xl., page 398. ‖ vi. Pl., 75 and 76. ¶ xxvi., page 792. ** xxxviii., page 496. †† xi., page 213. ‡‡ xxvi., page 792.

the scapular head of the triceps, and it seems partially adherent to the postaxial border of that muscle.

In no other marsupial whose myology is recorded is the humeral insertion lacking, and in all there is a distinct dorso-epitrochlearis present.

The extent of the vertebral attachment varies much amongst marsupials, and a costal origin is absent in many *e.g.*, *Didelphys*,* *Dasyurus*,† and Koala,‡ &c.; while in Wombat§ it arises from no less than six of the lower ribs. In the three forms described by Cunningham‖ only the last rib afforded an attachment to the muscle.

In *Echidna* Mivart¶ describes and figures two muscles as representing the latissimus. The posterior of these is interesting, as its insertion corresponds with that in *Notoryctes*. It is "very elongated, and is triangular from its origin as far as the elbow. It arises, by digitations, from six ribs (namely from the 8th to the 13th), and, becoming narrower, passes beneath the interior condyle. A little below the middle of the forearm it becomes intimately united with the surface of the flexor carpi ulnaris." The ulnar insertion of the panniculus is figured as in close dorsal relation to the latter. The anterior muscle from the first eleven dorsal spines is "inserted into the inner condyle of the humerus, in union with what appears to be the dorso-epitrochlear." This "dorso-epitrochlear" the author describes as arising from the posterior extremity of the vertebral border of the scapula and from the tendon of the teres major, and as inserted into the inner condyle of the humerus with the second part of the latissimus by a very strong tendon. The term "dorso-epitrochlear" as applied to this slip cannot be retained, as the fibres in question are undoubtedly only a deep slip of the latissimus. The true dorso-epitrochlear fibres are to be sought for amongst the fibres of insertion of the posterior part of the latissimus. Westling indeed reckons the latter muscle as simply a dorso-epitrochlearis (including "dorso-antebrachialis" and "dorso-brachialis" portions).**

In *Ornithorhynchus*, Owen,†† following Meckel, describes the latissimus as long and broad, arising from all the dorsal and lumbar spines and the eleven posterior ribs, and inserted by a broad and strong tendon into the distal half of the ulnar margin of the humerus, and, with part of the panniculus, into the fascia attached to the olecranon and spreading over the forearm. At its anterior part the muscle may be divided into a superficial and a deep stratum. Here, as in *Echidna*, the dorso-epitrochlear fibres are probably represented by those which descend into the forearm and spread out in its fascia.

In Cuvier & Laurillard's plates,‡‡ however, a segmentation is figured into an anterior or spinal and a posterior or costal portion, answering to Mivart's similar segments in *Echidna*.

In *Chlamydophorus*§§ the muscle also consists of two parts, but the anterior, which arises from hinder dorsal and anterior lumbar vertebræ, is inserted into the "posterior inferior angle of the post-scapula." This is unrepresented in any other *Edentata*. The second (posterior)

---

* xxix.; page 156. † xxxvi., page 105. ‡ xxviii., page 129. § xxix., page 156. ‖ iv., page 5. ¶ xxxix, page 380. ** lxii., page 21. †† xlv., page 11. ‡‡ vi. Pl., 266, *i.* and *i. 1.* §§ xxvii., page 236.

part of the muscle is costofascial in origin, is closely attached to the pectoralis quartus, and has the usual humeral insertion close to the teres major. Other *Edentata* vary as regards origin of the muscle, but all possess the usual humeral insertion, while, in addition, they all possess a dorso-epitrochlearis element associated with the latissimus, and often closely connected with the panniculus or pectoralis quartus. The insertion of the dorso-epitrochlear muscle is more variable than in marsupials, and is frequently prolonged into the fascia of the forearm (*Chlamydophorus** and *Orycteropus*†), or even to the palmar fascia (*Cyclothurus*‡), and it may be partly united with the scapular triceps, as in *Orycteropus*.§

In *Talpa* Cuvier & Laurillard‖ figure the latissimus as giving off a slip to the fascia of the forearm before becoming inserted into the humerus. This is not mentioned by Freeman,¶ but is plainly a true dorso-epitrochlear slip.

In this animal, as noted by the latter observer, the latissimus is rather large, and consists of two portions, anterior and posterior, separated by an interspace. The two parts, however, unite, and are humeral in their insertion.

A dorso-epitrochlearis is present in all the *Insectivora*. It is broad and thin in *Gymnura*.** In *Chrysochloris*†† it consists of fibres, which pass from the latissimus to the ossified tendon of the flexor profundus digitorum. The latissimus itself in this animal is inserted into a process running out from the internal condyle of the humerus.

The dorso-epitrochlearis is usually present in *Rodentia* and *Carnivora*. In the Rabbit‡‡ it is continued into the flexor carpi ulnaris according to Humphry.

M. serratus magnus (figs. 6, 7, and 21, *s.mg.*) consists of two portions—anterior and posterior.

The anterior, by far the larger, is a fan-shaped muscle, partly cervical, but chiefly costal in its origin.

The costal fibres arise as a series of fleshy slips from the first five costal arches, the more posterior origins being partly overlapped by the lateral free margin of the M. rectus abdominis. The origin from the first costal arch is from the vertebral segment, and partly indeed from its tubercle dorsally. The cervical fibres form only a small anterior portion of the muscle lying dorsal to the cords of the brachial plexus, and arising from the transverse process of the seventh cervical vertebra, and slightly from the corresponding portion of the fused cervical vertebral mass.

This anterior portion of the muscle is inserted along the whole length of the ventral lip of the vertebral border of the scapula close to the rhomboid insertion.

The posterior sector of the muscle (not shown in drawing) is separated from the anterior at its origin by a very considerable

---

* xxvii., page 236. † xv., page 574. ‡ xxvii., page 237. § xv., page 574. ‖ vi. Pl., 80, fig. 5. ¶ xi., page 212. ** viii., page 395. †† xxv., page 807. ‡‡ xx., page 151.

interval. It is a slender slip, placed under cover of the latissimus dorsi, which arises from the eighth, ninth, and tenth ribs, a short distance external to the line of their angles (and distinctly from the dorsal aspect of the chest wall). This runs forwards under cover of the latissimus to reach the hinder angle of the vertebral border of the scapula. There it crosses the posterior part of the insertion of the rhomboid, and is inserted into the dorsal aspect of this angle of the bone. At its insertion its fibres are close to and parallel with the scapular attachment of the anterior sector of the muscle with whose fibres it was evidently in series, constituting a *retractor scapulæ* muscle. Its nerve supply was from the nerve to the serratus.

There is no separate levator anguli scapulæ muscle present, the serratus as described representing the entire "*trachelo-costo-scapular*" muscle of Testut.*

Amongst marsupials the levator scapulae is nearly always lacking as a separate muscle, and the serratus is invariably trachelo-costo-scapular in its attachments, and is generally a continuous sheet. The extent both of its costal and its cervico-vertebral attachment is very variable. It is a single and continuous sheet in Koala,† *Thylacinus*, and *Phascogale*,‡ *Dasyurus* and *Phalangista*,§ *Macropus gig.* and *minor*.‖ Macalister found it in Wombat‖ divided into a weak upper part from four cervical vertebræ and three upper ribs, and a strong lower part from the ribs from the fifth to the eleventh, converging to the subscapular aspect of the inferior angle of the scapula, and a small part of the axillary margin. The condition was the same in one specimen of *Sarcophilus*,‖ but in another¶ he found a separable levator anguli scap. from the second and third cervical transverse processes.

In *Didelphys*** a levator anguli scapulae is wholly or partly separable. Cunningham†† found "an indication of a division of the serratus in *Cuscus* into a cervical and a costal portion."

In *Dasyurus*,‡‡ although the muscle is continuous, MacCormick describes the posterior five costal digitations as converging "in a fan-like manner, so as to come to a point at the posterior superior angle of the scapula, where they are inserted tendinously. The posterior edge of the tendon folds round the posterior part of the insertion of the rhomboid." This latter part of the muscle, as well as the detached posterior sector in Wombat,§§ I take to be homologous to the detached posterior slip in *Notoryctes*, although the latter is more dorsally placed, and altogether beneath the latissimus; *c.f.*, also Cuvier & Laurillard's plate of *Phal. cavifrons*.‖‖

In *Echidna*¶¶ the serratus magnus and levator anguli scap. are inseparable, forming a thick layer, extending back as far as the fourth rib only, or the fifth rib according to Westling.***

Meckel††† describes the serratus magnus in *Ornithorhynchus* as con-

* lvi., page 66. † xxviii., page 129, and lxxii. ‡ iv., page 6. § xxxvi., page 110. ‖ xxix., page 155. ¶ xxx., page 18. ** xxxviii., page 478, and vi. Pl., 175, fig. 3. †† iv., page 5. ‡‡ xxxvi., page 110. §§ xxix., page 155. ‖‖ vi. Pl., page 178. ¶¶ xxxix., page 383. *** lxii., page 13. ††† xxxviii., page 487, and xxxvii.

sisting of two distinct portions—a posterior costal from the first three ribs, and an anterior part from the six lowest cervical vertebræ. The fibres of the former converge to the inferior angle of the scapula, and those of the latter to the vertebral margin. In addition he describes* two levatores anguli scapulae, one or both of which, however, are more probably to be looked upon as of the nature of "acromio-trachelien" muscles.

In *Chlamydophorus*† the serratus magnus is large, single and undivided, the levator anguli scapulae being unsegmented from it. In *Tatusia* and *Dasypus*, Macalister‡ found it bipartite, the anterior costo-cervical part including levator anguli.

Humphry§ recognises in the Aï both anterior and posterior serratus factors and levator anguli, and Macalister‖ found the same in *Cyclothurus*.

In *Orycteropus* and several other Edentates¶ the "*trachelo-costo-scapular*" system of fibres is either continuous or imperfectly divided.

In Agouti and various other Rodents** (Guinea Pig, Rabbit, and Hare) conditions obtain similar to those just described, *i.e.*, there is a "trachelo costo scapular" muscle corresponding to the serratus magnus and levator scapulæ. In Agouti it is indivisible; in the other forms there is a line of separation in the muscular sheet opposite the third rib, which Mivart and Murie regard as marking off the levator. In the Rabbit Leche†† follows Krause in regarding as the true levator anguli a distinct muscle which others‡‡ regard as a rhomboideus capitis.

In *Talpa*§§ the serratus and levator scapulæ are distinct, and the former purely costal in origin. So also in *Erinaceus* and *Chrysochloris*‖‖, though in the latter the anterior border of serratus is overlapped by the levator. In *Gymnura*, however, according to Dobson¶¶, the serratus magnus is "very large, consisting of a cervical and a thoracic portion, the former the united levator anguli scapulæ."

In most *Carnivora* the trachelo-costo-scapular muscle is a continuous sheet.

M. subclavius (fig. 3, *s*, and figs. 6 and 7, *s.c.*) takes origin from the anterior border and part of the ventral surface of the first costal arch, being attached to, and around, the prominent tubercle on the anterior border of the rib. At this point the costal arch exhibits in some specimens a segmentation into vertebral and sternal portions, in the shape of a synchondrosis whose plane cuts the tubercle obliquely. The muscle thus arises from adjacent portions of *both* sternal and vertebral rib-segments.

This subdivision is not visible in all specimens.

The muscle thus arising is comparatively narrow at its origin, but spreads out into a broad and slightly tendinous band as it proceeds forwards and outwards to its insertion, which is into the mesial border of the "mesoscapular segment" of the shoulder-girdle, partly into the adjacent part of the mesial border of the

* xxxviii., page 478. † xxvii., page 242. ‡ xxvii., page 242. § xxii., page 32. ‖ xxvii., 242. ¶ xv., page 570, and xxvii., page 243. ** xl., page 393. †† xxvi., page 730. ‡‡ lvi. and xl., page 393. §§ xi., page 212. ‖‖ xxvi., page 767. ¶¶ viii., page 394.

acromion, and slightly in front of this into to the fascia over the supraspinatus muscle. In its course it passes under cover of the clavicle, and of the cleido- and deltotrapezius. At its origin it lies immediately mesiad of the insertion, into the ventral face of the first costal arch, of the M. rectus abdominis, and immediately dorsal to it the great vessels of the forelimb arch over the first rib to enter the axilla. They are, however, sunk in the deep concavity behind the tubercle of origin of the muscle. Under cover of the tendon of insertion there stretches a strong ligamentous arcuate band between the coracoid and the mesoscapular end of the clavicle—a *coraco-clavicular* ligament. As the muscle passes under cover of the clavicle and cleido-trapezius the post-axial border of the subclavius is more or less adherent to the deep surface of these structures, and a deep lamina of the tendon of insertion is attached or adherent to the coraco-clavicular ligament.

The origin of this muscle amongst marsupials is a very constant one. It arises from the first costal cartilage as in man, or from the first rib. In *Notoryctes* no fibres from any other source of origin enter the subclavius such as Rolleston has described arising from the sixth costal cartilage in Wombat.*

The insertion, on the other hand, is very variable in this order. The fibres are wholly arrested at the clavicle as in man in Cuscus, *Phascogale*,† *Macropus major* and *minor*, *Phalangista cavifrons*,‡ and Koala (usually).§

In *Thylacinus*|| it is attached solely to the fascia over the supraspinatus muscle, constituting a variety of sterno-scapular muscle.

In *Sarcophilus*¶ Macalister found it attached to the clavicle only in one case, and to clavicle and scapular spine in another, and to clavicle and acromion in *Didelphys*;** while in *Dasyurus viverrinus* and *Phal. vulpina*†† it is inserted into clavicle, acromion, and supra-spinatus fascia, and in Wombat, by means of the latter to the whole length of the scapular spine (Rolleston).‡‡

In *Echidna* and *Ornithorhynchus*, according to Rolleston,§§ the subclavius muscle is represented by the epicoraco-humeral muscle of Mivart.|||| This arises in *Echidna* from the ventral surface and outer border of the epicoracoid, and is inserted into the radial tuberosity of the humerus between the pectoral and supra-spinatus insertions and into a ridge running distally from this.

The muscle in *Ornithorhynchus* corresponding to Mivart's epicoraco-humeral has beeu figured by Meckel, as already noted,¶¶ under the name of an anterior deltoid, and by Cuvier and Laurillard*** as a middle or small pectoral.

Humphry, as against Rolleston, takes the latter view of this muscle in Monotremes, when he says,††† "I conceive the pectoralis minor to

---

* li., page 626. † iv., page 6. ‡ vi. Pl., 195, 181, and 179. § lxxii., page 226, and xxviii., page 130. || iv., page 6. ¶ xxix., page 158, and xxx., page 130. ** xxix., page 158. †† xxxvi., page 111. ‡‡ li., Explan. of fig. 3 and Pl. 47. §§ li., page 617. |||| xxxix., page 383. ¶¶ Supra p. *** vi. Pl., 266, fig. 2. ††† xx., page 157.

be formed from factors of the pectoralis major which, or some of which, represent the epicoraco-humeral of Urodelans, Reptiles, and Monotremes." And Mivart himself regards the subclavius as represented in *Echidna* by "a small and thin muscle which arises from the anterior border of the first rib for the greater part of its length, and which is inserted into the coracoid immediately behind (or rather above) the origin of the coracobrachialis."*

This "costo-coracoid" muscle in *Echidna* is described and figured by Westling.†

I am indebted to Dr. McKay for most of the following particulars regarding the corresponding conditions in *Ornithorhynchus*.‡ A fairly-strong costo-coracoid muscle is present, with similar attachments to those in *Echidna* given above, from Mivart. Its fibres converge to a tendinous insertion into the posterior tip of the coracoid. This muscle must, I imagine, correspond to the "pectoralis minor" referred to by Owen§ as "inserted into the coracoid," or less probably to his "subclavius," which he describes as "also inserted into the coracoid." While, then, the costo-coracoid muscle of *Ornithorhynchus* is either Owen's lesser pectoral or his subclavius, the other of these must find its homologue in a muscle called by Westling in *Echidna* "sterno-coracoid,‖ but which neither in that animal nor in the *Ornithorhynchus* is attached to the coracoid, though it is in close relation to that bone. Thus in *Ornithorhynchus* it arises from the anterior border of the first costal arch just mesiad of, and close to, the costo-coracoideus; and it also arises from the dorsal, or deep, aspects of both the interclavicle (slightly) and the presternum. It is inserted into the anterior half of the dorsal or deep surface of the epicoracoid in close relation to (mesiad of) the origin of the "epicoraco-brachialis." A somewhat more appropriate, if more cumbrous, name for this muscle is *M. sterno-costo-epicoracoideus*.

Both of these muscles (*Mm. costo-coracoideus* and *sterno-epicoracoideus*) I take to represent the ordinary mammalian subclavius, for not only are the two muscles in such close relation, possessing analogous attachments, but their innervation is from a common source, viz., a branch of the brachial plexus (ventral aspect) homologous to the *nervus thoracicus inferior* of Fürbinger in Saurians,¶ and probably to the "nerve to the subclavius" of mammals.

In *Echidna* Dr. McKay finds this nerve giving a branch to the phrenic, as the nerve to the subclavius occasionally does in man.

Their segmentation as distinct muscles is doubtless correlated with the partially independent mobility of coracoid and epicoracoid.

The marked divergence of type from the ordinary mammalian subclavius is dependent upon the high development of the coracoids, causing interruption of the fibres, and thus arresting them in their passage towards clavicle and scapula.

In *Chlamydophorus*** the subclavius is large, and has a wide origin from the broad sternal segment of the first costal arch. It passes beneath clavicle, and is inserted into the coracoid process, the acromion and the acromial end of the clavicle very slightly or not at all (Hyrtl).††

---

* xxxix., page 382. † lxii., page 14, and Taf. ii., fig. 6 *c.c.* ‡ lxxvii. § xlv., page 6. ‖ lxii., page 15, and Taf. ii., fig. 6 *st. c.* ¶ xiii., page 709-11. ** xxvii., page 241. †† xxiv., page 32.

Macalister also describes separately a retro-clavicularis included by Hyrtl as part of the subclavius, and passing from first rib to acromion and supraspinous fascia.

In *Orycteropus** Galton found the subclavius arising from the manubrium sterni and its junction with the first rib, and also by fibres prolonged from the terminal aponeurosis of the rectus abdominis. Humphry† in the same animal found it arising from first and second costal cartilages and adjacent part of sternum, while both authors fonnd it inserted into acromial part of clavicle, acromion, and fascia over the supraspinatus muscle; while in addition Galton found it inserted into a sesamoid bone just below the acromio-clavicular joint, embedded in fibres of the deltoid, and which he surmises may possibly be a "meso-scapular segment." He also says that a thin stratum derived from the lower portion of the muscle finds insertion by aponeurosis along the inner edge of the strong coraco-acromial ligament.

According to Humphry‡ and Macalister the muscle is entirely absent in *Manis* and the Anteaters and Armadilloes. In Aï it was thin and weak. In *Tatusia*§ Macalister found it very large.

In *Dasypus sexcinctus*, according to Galton‖ and Macalister,¶ the muscle is strongly developed. And in Cuvier & Laurillard's plate, No. 260, the muscle is seen closely to resemble that in *Notoryctes*. Galton describes it as arising from the "irregularly oval and roughish depression seen at the expanded anterior termination of the first rib, and also from its superior edge for a short distance." "It is inserted by a flat tendon along the whole extent of the upper ridge of the long acromion process of the scapula, and becomes, moreover, continuous with the strong fascia which covers the head of the humerus and which is lost over the supra-spinatus. The strong coraco-clavicular ligament passes across through the substance of the muscle, close to the insertion of the latter, splitting it into two unequal portions, the smaller and anterior of which dips under the ligament to join its tendon, while the largest portion passes over the ligament." This insertion (see also Galton's fig. 2, pl. 44) much resembles that in *Notoryctes*.

In *Dasyprocta cristata* Mivart and Murie** describe a "sterno-scapular" muscle with double origin, the smaller factor of which they suggest (following Meckel††) may be subclavius. (Galton‡‡ refers to this observation in connection with the subclavius in *Dasypus*.) The whole muscle is long and narrow, and the smaller head arises from the outer side of the base of the manubrium and from the cartilage of the first rib. The larger head arises from the sternum between the origins of the first and second parts of the pectoralis major. The muscle is inserted slightly into the distal end of the clavicle and into the scapula and fascia over the supra-spinatus.

In the Rabbit and Guinea Pig, according to the same authors,§§ the two slips are present, but in the Hare there is only one broad origin. In the Porcupine also, according to Galton,‖‖ the muscle is a single strap-like band arising from the costal portion of the first rib, and

---

* xv., page 571. † xxi., page 297, and xxxv., page, 494. ‡ xxii., page 26. § xxvii., page 241. ‖ xiv,, page 528. ¶ xxvii., page 241. ** xl., page 398. †† xxxviii., page 444. ‡‡ xiv., page 528. §§ xl., page 398. ‖‖ xiv., page 529, and vi. Pl., 229, fig. 2.

inserted partly into the scapular end of the clavicle and into the spine of the scapula and the fascia over the supraspinatus muscle. (*C.f.* also Rolleston's detailed description of the double sterno-scapular muscle in the Guinea Pig, the smaller of which he also regards as homologous to the subclavius.*)

Windle just mentions† the subclavius as "a strong muscle" in *Erethizon epixanthus*, but the same author‡ has described in detail the condition in the Rabbit, and concludes that the deep sterno-scapular slip there present represents probably part at least of the subclavius.

In *Talpa* Freeman§ refers to the large subclavius arising from prosternum and first rib, and dividing into two parts to be inserted (*a*) into the outer third of the dorsal margin of the coraco-clavicle (*b*) into the short acromion and the acromio-clavicular ligament.

Cuvier and Laurillard‖ figure a subclavius in the Hedgehog whose origin very closely resembles in its relations that of *Notoryctes;* its insertion¶ appears to be clavicular and acromial.

Leche** notes a subclavius as present in *Condylura*, *Solenodon* and *Gymnura*.

A true subclavius seems hardly to be represented amongst the *Carnivora*, though sterno-scapular slips are found, *e.g.* in Dog and Hyæna**, and in *Procyon cancrivorus*†† and others. Probably most of these slips are of the nature not of subclavius, but of "pectoralis minimus," or, as Windle names them, "deep manubrial" slips of the pectoral group (see this author's discussion on the subject of sterno-scapular slips).‡‡

M. pectoralis (figs. 3, 6 and 7, *p.a.*, *p.b.*, and *p.c.*). The pectoralis system of fibres consists of a large mass of considerable thickness and of the ordinary triangular or fan-like shape. It is separable into three sectors, which we have distinguished as A, B and C, with which will also be described the humeral portion of the panniculus carnosus.

In one specimen the sternal rostrum was specially large, and was perforated by a large oval fenestra (fig. 21, *fen.*) filled up with fibrous membrane from either side of which fibres of opposite pectoral muscles took origin.

M. pectoralis A (figs. 3, 6 and 7, *p.a.*) arises from the rostrum and body of the presternum and from the sternal end of the clavicular arch, the latter fibres being overlapped at their origin by the sternal attachment of the sterno-mastoid muscle. Its deepest fibres further arise from the broad, flat and expanded inner end of the first costal arch. From this origin the fibres extend outwards, chiefly transversely, but the hinder fibres more obliquely, towards the humerus, and they end in a partly fleshy insertion which is attached, along with that of the next sector, into the distal of the two tuberous elevations of the "deltoid ridge," which is thus a *deltopectoral tuberosity.*

---

* li., page 611-2. † lxv., page 128. ‡ lxvii., page 354. § xi., page 211. ‖ vi. Pl.. 75, fig. 2 *h.* ¶ vi. Pl., 76, fig. 2. ** xxvi., page 764. †† lxvi., page 82. ‡‡ lxvii., page 352, *et seq.*

M. pectoralis B (figs. 3, 6 and 7, *p.b.*)—the second sector of the pectoral mass—is separated from the more anterior, A, by an almost transverse cleavage line, but its fibres are otherwise simply in series with the fibres of A. It arises from the whole length of the mesosternum, and also by deep digitations from the adjacent parts of the sternal segments of the second to the sixth costal arches, inclusive. Its fibres pass obliquely outwards and forwards, converging to a thin flattened tendon which becomes continuous at the humeral end with the more fleshy insertion of pectoralis, A, which it partly overlaps.

M. pectoralis, C (figs. 3, 6 and 7, *p.c.*), is separated from the rest of the muscle superficially by a sulcus of radial cleavage, but its insertion is totally different from that of the two preceding sectors. It is the most posterior and lateral of the three pectoral muscles, and on the whole its origin is deeper, and is largely covered by the muscle last described.

It arises by a series of deep fleshy slips from the sternal segments of the second to the seventh costal arches (inclusive), laterad of, and overlapped by, the corresponding slips of pectoralis B, from which it is completely separate.

Its outer or axillary margin is not covered by B until it enters the axilla; it is, however, covered posteriorly (caudad) by the mesio-ventral portion of the superficial muscular sheet of the panniculus. The latter is here very thin, and consists of fibres arising from the anterior abdominal aponeurosis near the mesial line, and extending forwards and outwards. These fibres do not form a distinct band, but they probably represent the pectoralis quartus, which is otherwise absent.

Immediately external to the lateral border of pectoralis C the panniculus fibres form a denser layer, covering a portion of the rectus abdominus, which courses forwards beneath them and parallel with pectoralis C. The fibres of the humeral portion of the panniculus stratum cover the whole lateral thoracic wall in a continuous sheet, extending from the surface of pectoralis C laterally and dorsally as far as the ventral border of the latissimus. Its fibres are directed forwards, converging to enter the axilla, and are then inserted into the border of a tendinous arch, which crosses the axillary vessels and nerves. The ventral end of this tendinous arch is attached to, and inserted along with, the insertion of pectoralis C into the greater (radial) tuberosity of the humerus close to the joint-capsule, and just external to, and also bridging over, the bicipital groove, and thus indirectly into the lesser tuberosity of the humerus.

It appears to me very evident that the sectors denominated A and B together represent the "pectoralis major;" and that sector C represents the "pectoralis minor." Further, a pectoralis quartus is not

differentiated from the "humeral" or "abdomino-humeral" panniculus.

Adopting Windle's* convenient classification of the pectoral group of fibres, I may say that pectoralis A is a "superficial manubrial," or rather "manubrio-clavicular;" pectoralis B is a "gladiolar," fused with a superficial lamella of a "costal" segment; that pectoralis C is a deep "costal" segment; and that an "abdominal" segment is represented by the abdomino-humeral panniculus, no special pectoralis quartus being present distinct from the latter. Upon the question of the morphological relations of the pectoral muscles to the panniculus, *c.f.*, also paper by Parsons upon the myology of rodents;† this author regards the pectoral mass as differentiated from the panniculus.

With regard to the attachment of the humeral panniculus it may be noted that the dorsal end of the tendinous arch described above possesses no definite attachment to bone. It is traceable dorsally under cover of the latissimus, which there overlaps the humeral panniculus as the latter enters the axilla. It is doubtless the homologue of the achselbogen so commonly present in mammals, such as, for example, MacCormick‡ notes in *Phalangista*, which there, as in *Notoryctes*, receives fibres of the panniculus, and in *Phalangista* also fibres of the pectoralis quartus. If we are to look upon part of the panniculus fibres in *Notoryctes* as those of a pectoralis quartus, then the fibres of the latter muscle are not inserted along with or close to those of the pectoralis major as in Cuscus, *Thylacinus*, and *Phascogale*,§ and in *Phalangista vulpina*,‖ but, like the fibres of MacCormick's "ventro-humeral" muscle (true pectoralis quartus?), are blended with the tendon of the pectoralis minor.

The question of the homology of the pectoralis quartus has been the subject of much discussion by many writers, and it is certain that various pectoral and axillary muscles have indifferently received this name. Windle concludes his discussion of the subject by remarking that "the diverse views held by authors who have been cited, and by others who might have been mentioned, with regard to pectoralis quartus and achselbogen, are many of them reduced to an agreement, by what I believe to be a right comprehension of the so-called panniculus of the abdomen, namely, that it is the hindermost portion of the members of the pectoral group." I cannot think that this is a satisfactory mode of statement, and I should incline rather to accept Prof. Cunningham's¶ view in reference to axillary muscles generally, that in that region "there is not the same sharp, well-defined subdivision between the panniculus and the deeper stratum that exists elsewhere."

For a general survey of the arrangement of the elements of the pectoral group of muscles in various mammalian orders I would simply refer to Windle's comprehensive sketch in the memoir already quoted from.**

M. subscapularis (figs. 6 and 7, *sbs.*). A comparatively broad and triangular muscle, whose fibres are arranged in a bipenniform manner. Its fibres arise from the venter or inner aspect of the

---

* lxvii., page 349. † xlviii., page x *et seq.* ‡ xxxvi., page 112. § xxi., page 7. ‖ xxxvi., page 112. ¶ v., page 385. ** lxvii.

scapula in its whole extent, and from the septum between it and the adjacent teres major, and they are inserted into the lesser *(postaxial)* tuberosity of the proximal end of the humerus.

The muscle not only covers the mesial aspect of the comparatively narrow scapula, but projects both anteriorly and posteriorly beyond the limits of the bone so as to lie in contact with the supra-spinatus preaxially and with the broad scapular head of the triceps postaxially (the latter muscle being attached to the whole of the postaxial or "axillary" border of the scapula).

Neither in Marsupials nor in the Eutherian orders with which comparison has been specially made does the subscapularis present features which call for special remark. It varies for the most part merely in its size relative to other muscles and to its surface origin, and in its degree of attachment to or freedom from the teres major on the one side and the supra-spinatus on the other. In the Dog Humphry* notes that it is partly blended with the supra-spinatus, and in the Mole with the teres major. Freeman,† however, describes it as a small independent muscle in the last-named form.

In *Ornithorhynchus* Owen‡ notes it as a very narrow muscle. I find it relatively rather broad, much exceeding the width of the scapular plate, occupying indeed portions of both inner and outer surfaces. In a recent short paper§ Dr. W. J. S. McKay and the writer have called attention to the significance of this attachment of the subscapularis in the identification of the borders and surfaces of the monotreme scapula.

In *Echidna*, subscapularis, according to Mivart and Westling,‖ is confined to the outer surface of the scapula posterior to the origin of the long head of the triceps.

Dr. McKay and the writer find that in *Echidna* the muscle arises largely as Mivart describes it, but that in addition it arises from the whole of the *actual* posterior border of the scapula, and slightly encroaches upon the inner aspect of the bone, when its limit is indicated by a faint ridge near the margin.

The muscle which Leche¶ takes for subscapularis in *Ornithorhynchus* is certainly not the homologue of the true subscapularis, which he rightly recognises in *Echidna*, but corresponds to that which Westling names the subscapularis accessorius in *Echidna*. The true subscapularis in *Ornithorhynchus* is erroneously described by Leche as a large second part of teres major (*q.v.*).

M. teres major (figs. 6 and 7, *t.m.*) arises from the posterior (post-scapular) angle of the scapula, which forms a backwardly prolonged horn of the crescentic base or mesial border of the bone (*vide* fig. 8), and from a tendinous intersection between it and the adjacent axillary border of the M. subscapularis.

Its origin from bone is narrow and tendinous, and from it the muscle spreads out somewhat in its course towards the proximal part of the shaft of the humerus, into which it is inserted, under

---

* xx., page 158, Note. † xi., page 214. ‡ xlv., Vol. iii., page 5. § lxiv. xxxix., page 384. ¶ xxvi., page 796.

cover of the biceps muscle, into the inner lip of the bicipital groove.

The muscle is quite free from the latissimus dorsi. Its origin is excluded from the axillary border of the scapula by the greatly extended scapular head of the triceps, which occupies the whole of that border lying close to the subscapular muscle.

The muscle in Marsupials is usually well developed, and has the ordinary attachments. It is frequently in connection with the latissimus at its insertion (*e.g.*, *Thylacinus**), and with the subscapularis near its origin. In no case is it excluded from the axillary or posterior margin, as in *Notoryctes*.

In *Ornithorhynchus*, Owen† notes a large teres major. Leche‡ describes it as consisting of two quite separate and well-developed portions, the larger of which, doubtless, corresponds to a muscle which Meckel§ regards as the separately developed scapular portion of the latissimus, while the other, deeper, shorter, and thicker, corresponds to the teres major of the latter author. As already stated, it is the first part of Leche which is the true teres major. His second part is subscapularis.

In *Echidna*, Mivart‖ correctly notes it as a small muscle tendinous at origin and insertion, arising from the recurved posterior angle of the scapula, and inserted into the prominent ridge running down from the lesser tuberosity.

In *Chlamydophorus*¶ the muscle is large, and "occupies an extensive area of the posterior margin of the post scapula." It is attached to the subscapularis, as also in *Tatusia* and *Dasypus*,¶ while in all these it is separate from the latissimus.

In some other Edentates, however, it is united with the latter at its insertion.

In *Cyclothurus*** it is a huge muscle, arising from axillary border, and also from spine of scapula, and having close relations to the scapular triceps, as well as to the latissimus. Galton†† notes that Cuvier regarded the muscle as part of the triceps, but maintains that at least the fibres arising from the scapular costa are to be regarded as teres. Humphry‡‡ speaks of the whole muscle as teres; and in the same animal he notes a strap-like portion of muscle which passes from the angle of the scapula, with the latissimus, to be inserted into the inner side of the *olecranon* and partly into the inner side of the forearm. He is doubtful whether this belongs to latissimus or teres.

Macalister§§ notes that in *Orycteropus* and *Tatusia* dorso-epitrochlear fibres arise from the teres major.

In *Orycteropus* Galton notes the muscle as at its origin completely fused with the scapular triceps.‖‖

In the Mole¶¶ the teres major is very large, "perhaps more hypertrophied than any of the arm muscles," arising from upper two-thirds of axillary border, a broad surface on the vertebral border, by an additional slip from the anterior part of vertebral border, and from

---

* iv., page 8. † xlv., page 6. ‡ xxvi., page 795. § xxxvii., page 26. ‖ xxxix., page 384. ¶ xxvii., page 245. ** xvi., page 248. †† xvi., page 249. ‡‡ xxii., page 35. §§ xxvii., page 246. ‖‖ xv., page 578. ¶¶ xi., page 213.

interscapular ligament. Its tendon of insertion is largely united with the latissimus.

In *Chrysochloris** it arises as a bicipital muscle, but the heads unite with each other and with the latissimus towards their insertion.

M. teres minor is entirely absent.

Amongst *Marsupials* it is absent as a rule, according to Meckel.† It is present, however, in Cuscus, and Thylacine, Koala‡ occasionally,§ *Dasyurus viverrinus*, and *Phalangista vulpina*,‖ though in the latter Macalister could not separate it from the infraspinatus.

Cuvier and Laurillard figure it in *Macropus giganteus*.¶

In *Phascolomys* and *Sarcophilus*** Macalister found it represented by a fibrous band merely.

It is said to be entirely absent in the *Monotremata*.†† I cannot, however, think that sufficient consideration has been given to the claims of the small muscle, which Westling‡‡ names "subscapularis accessorius" in *Echidna*, to represent a teres minor. I have already pointed out that it is the homologue of this muscle in *Ornithorhynchus* which Leche erroneously describes as the subscapularis in that animal. In point of fact there is no essential difference between *Ornithorhynchus* and *Echidna* in respect of the arrangement of the muscles of this region For details of this arrangement I must refer to Dr. McKay's forthcoming account of the myology of the region in the two forms. But I have satisfied myself from that gentleman's dissections that the little muscle in question does not correspond with any other typical muscle of the region if we except the teres minor It is mentioned by Mivart in *Echidna*§§ as a "small delicate muscle," but he attaches no name to it, and the only view regarding it of which I am aware is Westling and Leche's, according to which it is, in the *Echidna*, a subscapularis accessorius, and in the *Ornithorhynchus*, the subscapularis itself. It is indeed possible that it is a "subscapularis accessorius." It receives its nerve supply from the Nervus axillaris like the subscapularis; but the twig of supply comes off the N. axillaris between the subscapular branch and that for the scapular deltoid, in fact nearer to the latter, with which nerve it is connected by a filament of communication; so that the mode of innervation is at least as consistent with the homology to a teres minor. But further, its position seems to negative its affinity to subscapularis, for the scapular head of the triceps passes between the two, so that the small muscle is contiguous on the other hand to the infraspinatus. A muscle thus arising from the scapula close to the glenoid cavity, intercalated between infraspinatus on the one hand and long or scapular head of the triceps on the other, may surely well enough be teres minor, especially as its innervation is quite conformable to that view of its homology. It is indeed only with regard to its insertion that any serious difficulty arises, for in both *Echidna* and *Ornithorhynchus* the muscle in question is inserted close to the subscapularis, though quite distinct from it, into the dorsal face of the expanded ulnar

---

* xxvi., page 796. † xxxviii., page 513. ‡ iv., page 8. § lxxii., page 227, and xxviii., page 130. ‖ xxxvi., page 117. ¶ vi. Pl., page 177-8. ** xxix., page 159. †† xxvi., page 795, and xxxix., page 384. ‡‡ lxii., page 15. §§ xxxix., page 385.

tuberosity, and separated by a considerable interval from the attachment of the infraspinatus to the dorsal face of the expanded radial tuberosity. Nevertheless there is no intervening structure between the two insertions, and the enormous lateral expansion of the neck of the humerus by means of the projections of the flattened tuberosities, in a plane almost at right angles to that of the projection of the epicondyles, may readily account for the dislocation of the insertion of a muscle which every other test would serve to indicate as teres minor.

Amongst *Edentata* the muscle is generally, though not invariably, present. It is small in *Chlamydophorus*.* It is absent according to Macalister, at least as a muscle distinct from the infraspinatus, in both *Bradypus didactylus* and *B. tridactylus* and in *Cyclothurus*†, though Humphry‡ seems to have found it in the last two, taking for it a slip of the scapular deltoid arising from the scapular spine in Macalister's view†.

Both in *Chlamydophorus*† and *Dasypus sexcinctus*§ it arises from the "lesser" or post-scapular spine of the scapula, the same which is present in *Notoryctes* (fig. 8, *p.s.s.*); and in *Orycteropus capensis*||, where the muscle is present, arising from the axillary costa, outer edge, there passes from the "middle of its inferior edge a strong tendon to the metacromial process of the scapula." This would seem to represent the ligament which in *Notoryctes* extends from the post-scapular spine to the metacromion (fig. 8, *p.s.m. lig.)*, bridging over the infraspinous fossa, but here no teres minor fibres arise from it. There can be little doubt that the second or post-scapular spine, when present, is to be regarded as an exaggeration of the dorsal lip of the "axillary" or posterior border of the scapula, from which in *Orycteropus* the teres minor arises. This lip in *Chlamydophorus* and *Dasypus* is fully developed into a post-scapular spine, but still gives origin to the teres minor. The latter muscle in both cases overlaps the triceps, and I think it certain that the exaggerated development of the dorsal lip of the axillary border into a second spine is simply due to a great expansion of the great scapular head of the triceps.

The muscle is absent in the Mole¶ and in *Gymnura*,** but present in the Hedgehog, Cape Golden mole, and others.††

Amongst Rodents it is stated by Mivart and Murie‡‡ to be present in Agouti, and in Rabbit, Hare, and Guinea Pig, but it is closely adherent to the infraspinatus, with which these authors believe Meckel§§ confounded it when he failed to detect its presence in this order.

Meckel§§ states that it is generally absent as an independent muscle in *Carnivora;* it is present, *e.g.*, in *Hyæna striata*, *H. crocuta*, and *Viverra*, according to Young and Robinson.||||

M. infraspinatus (fig. 8, *i.s.*) arises from the deep and narrow postscapular fossa between the meso-scapular (fig. 8, *m.s.s.*) and post-scapular spines (*p.s.s.*). It is smaller than the supraspinatus, and its fibres course outwards, and pass under cover of a narrow ligamentous bridge, which connects the post-scapular spine with the metacromion (fig. 8, *p.s.m. lig.*). It is then in-

* xxvii., page 244. † xxvii., page 245. ‡ xxii., page 33. § xiv., page 530. || xv., page 574. ¶ xi., page 214. ** viii., page 395. †† xxvi., page 795. ‡‡ xl., page 399. §§ xxxviii., page 513. |||| lxxii., page 190.

serted into the dorsal aspect of the greater or radial tuberosity of the humerus between the insertion of the supraspinatus and the origin of the "outer" humeral head of the triceps (fig. 8, *o.tr.*).

In the Marsupials generally, according to Meckel,* the supra spinatus is larger than the infra-spinatus. The only exceptions, I note, are *Macropus bennettii*† and Koala.‡

In the *Echidna*, Mivart§ describes this muscle as arising from the surface of the scapula between the long head of the triceps and the free margin of the spine and acromion (the actual anterior margin of the scapula); and Westling‖ figures and describes the same muscle. According to Westling, the muscle is innervated chiefly by the Nervus axillaris.

In *Ornithorhynchus* (McKay) the muscle occupies a much greater proportion of the inner surface of the scapula, owing to the ridge for the scapular triceps being much nearer the actual posterior border than is the case in *Echidna*. It otherwise corresponds to that in *Echidna*. It is innervated partly from the N. axillaris, but chiefly from the N. supracoracoideus (suprascapular nerve).

M. supraspinatus (figs. 8 and 15, *s.s.*) arises from the whole of the prescapular fossa, as well as from the preaxial border of the scapula and the prominent anterior angle of the vertebral border. Its fibres form a fleshy mass, which bulges considerably beyond the prescapular border, being in apposition with the fibres of the rhomboideus dorsally, and of the subscapularis ventrally. It passes outwards under cover of the acromion and "meso-scapular segment" to be inserted into the proximal facet upon the greater (radial) tuberosity of the humerus.

Neither among Marsupials nor the Eutherian orders specially noticed does this muscle present any remarkable features.

Among Monotremes the muscle arises from the *actual* inner surface of the scapula, owing to the remarkable modification of the scapula in this order. (See note by Dr. McKay and the writer in Proc. Linn. Soc. N.S.W.)¶

The muscle is supplied by the N. supracoracoideus, which represents the suprascapular nerve.

M. coraco-brachialis is entirely unrepresented in *Notoryctes*.

In no other Marsupial recorded is the coraco-brachialis absent, though in Wombat Macalister** describes it as "extremely small and rudimentary," while in several others only the coraco-brachialis brevis element is present, *e.g.*, *Thylacinus*,†† *Dasyurus*,‡‡ and *Myrmecobius*, *Chironectes*, and *Halmaturus*.§§

In the *Echidna* the coraco-brachialis system of fibres is extremely luxuriant, where it consists of the three distinct elements, which Wood‖‖ regards as constituting the typical muscle. One of the elements is, however, epicoraco-brachial in its attachments.

---

* xxxviii., page 499. † iv., page 9. ‡ lxxii., page 226, and xxviii., page 130. § xxxix., page 384, and Pl., page 52., figs. 1 and 2, *i.s.* ‖ lxii., Taf. ii., fig. 5. ¶ lxiv. ** xxix., page 160. †† iv., page 10. ‡‡ xxxvi., page 118. §§ xxvi., page 803. ‖‖ lxxi., page 45, *et seq.*

In the *Ornithorhynchus* the epicoraco-brachialis is fused with the coraco-brachialis brevis, so that only two distinct elements are present.

Amongst the *Edentata* it is entirely absent in *Cyclothurus* and *Pholidotus*.* In *Chlamydophorus** Macalister found it represented by a "very diminutive 'short variety,'" while Hyrtl† had found it absent in the specimen he dissected.

Leche states‡ that it is absent among the *Talpidæ*, but Wood§ states that the short variety is present in the Moles. The latter author found the middle variety alone in the Hedgehog, while Leche mentions long and short as present in that animal. Dobson‖ states that the muscle is entirely absent in *Gymnura*.

In Guinea Pig and Rabbit Wood¶ found the middle variety alone, in the Hare and Capybara the short only, and in Squirrel and Porcupine the long. In other Rodents two varieties co-existed.

Among *Carnivora*** the muscle is single in some, *e.g.*, short variety only in Dog and Cat, or two varieties may consist as in the *Ursidæ*.

M. biceps flexor antebrachii (figs. 6 and 7, *f.b.c.*) takes origin by one head only (the "long"), by means of a fine tendon, from the "upper" extremity of the glenoid margin at the root of the rudimentary coracoid. The tendon traverses the capsule of the shoulder joint to enter the bicipital groove between the tuberosities. Emerging from the capsule, it gives place to a narrow and somewhat ribbon-like muscle, which broadens somewhat as it descends to reach the region in front of the elbow. During nearly the whole of its course in the arm it is covered by the pectorals, and lies ventral to the teres major and inner part of the humeral triceps (fig. 6, *ih.tr.*).

Towards its insertion it is covered by the pronator radii teres (fig. 10). It is inserted into the tuberosity of the radius in close proximity to the insertion into the coronoid process of the brachialis anticus muscle, whose tendon it crosses, and with which it has a slight fascial connection.

Macalister,†† writing on "the homologies of the flexor muscles of the vertebrate limb," regards the flexors in both arm and leg as typically four in number.

These are, in the arm, 1st, *Coraco-radial*, which is "most frequently present, and most strikingly retaining its typical position and attachments"; 2nd, a *humeral head* of the biceps (only occasionally present in man); 3rd, the *gleno-ulnar* (corresponding to the long head of the biceps together with the aponeurotic tendon of insertion in man, hence the muscle is here *gleno-fascial*, not gleno-ulnar, as in other forms); 4th, the *brachialis anticus* portion of the flexor mass.

With regard to the first-named of these flexor elements, Macalister, however, remarks:—"In cases where the coracoid process is not developed, we sometimes find that the first muscle originates from a tendon which corresponds with the typical origin of this flexor; and

* xxvii., page 247. † xxiv., page 36. ‡ xxvi., page 804. § lxxi., page 52. ‖ viii., page 395. ¶ lxxi., page 52. ** lxxi., page 51. †† xxxi., page 287.

hence we have the compound gleno-radial muscle of the ruminants, in which, however, as Meckel indicates, a trace of a division may be seen," &c.

The condition just described is the condition of the biceps in *Notoryctes, i.e., gleno-radial*, but there it presents no trace of its composite character.

Amongst Marsupials the same author* describes the condition in the Giant Kangaroo and Wallaby as follows:—"The biceps is divided into two parts for its entire extent. Of these, the coracoid is generally the larger, and seems to be inserted into the tubercle of the radius; the glenoid origin is smaller and, ás usual, tendinous; crossing the head of the humerus and crossing the coraco-radial muscle, it is inserted with the ulna in company with the brachialis anticus, &c." . . . "In *Didelphys* and *Phalangista* the muscles are similarly arranged, as they are likewise in all the other *Marsupials* which I have examined."

In *Myrmecobius*† the same elements of the biceps are present, but at their origin they are fused into a tendon, coraco-glenoid in attachment, which is quite outside the capsule of the shoulder-joint. Somewhat similar partial union of the coraco-radial and gleno-ulnar elements is found in *Didelphys* and in *Chironectes* according to Leche,† while in *Thylacinus*‡ and *Dasyurus*§ the tendons of origin are separate at their commencement. The bellies of the muscle in Cuscus and *Phascologale*‡ are separate throughout, the tendons of origin being partially fused.

In *Perameles*|| there is no coracoidal head, but the insertion is radio-ulnar.

In *Echidna* Westling¶ describes two incompletely separated portions. The smaller is epicoracoidal, rising close to the "epicoraco-humeral" muscle; the larger arises from the coracoid and from part of the tendon of the coraco-brachialis longus. Mivart** describes the muscle with these origins as a single mass, inserted into both radius and ulna. According to Westling it is the smaller epicoracoid portion which passes by a long thin tendon to the ulna.

In *Ornithorhynchus*†† the muscle is bicipital, one head epicoracoidal, the other coracoidal. Both are inserted into the middle third of the radius.

In *Chlamydophorus*‡‡ biceps is "a slender muscle which arises by one head from the root of the coracoid process on its inner side at the margin of the glenoid cavity," It is inserted into a pit in front of the coronoid process of the ulna. It is similar in *Tatusia.*‡‡

In *Dasypus* it has a radial as well as an ulnar insertion, and it has *sometimes* a coracoid head of origin, either independently or from the coraco-brachialis muscle, in addition to the constant glenoid one.

In *Cyclothurus*‡‡ the muscle is glenoid in origin, and is inserted partly with the brachialis anticus to the ulna and partly into the tubercle of the radius.

In *Orycteropus*§§ it is gleno-radial, but receives the clavicular deltoid

---

* xxxi., page 284. † xxvi., page 798. ‡ iv., page 11. § xxxvi., page 119. || xlv., page 12. ¶ lxii., page 18. ** xxxix., page 385. †† xlv., page 8, and xxvi., page 798. ‡‡ xxvii., page 246. §§ xxvii., page 247.

which is inserted with it. Humphry* found it arising from the fore part of the coracoid.

In *Pholidotus*† it is a simple gleno-ulnar muscle.

In *Bradypus tridactylus*† it is radial in insertion, and it has a glenoid and a humeral head of origin, while Humphry‡ found a third slip arising from the coracoid, and Meckel§ found a slip from the deltoid.

Among the *Insectivora* there is almost always only a glenoid head. The muscle is ulnar in its insertion in *Gymnura*,‖ *Erinaceus*, and *Chrysochloris*,¶ radial in *Talpa*,** and radio-ulnar in some others. In *Talpa*** it is a very considerable and curiously modified muscle.

In the Rodents usually only a glenoid head is present, usually inserted into the ulna. It is, however, gleno-radial in *e.g. Erethizon*.††

It is generally gleno-radial in *Carnivora*.

M. brachialis anticus, s. *internus* (figs. 6, 8, and 10, *b.a.*), arises from the concave outer surface of the shaft of the humerus, extending as far up as the region of the neck. Here an oblique line separates it from the proximal part of the origin of the "outer" humeral head of the triceps (fig. 8, *ot.r.*), whose fibres in this region encroach upon the outer surface of the neck of the bone, extending dorsally to the base of the radial tuberosity, and thus separating brachialis anticus from infra-spinatus. Below the oblique line mentioned the brachialis anticus is separated from the triceps by a continuation upwards of the supinator crest of the humerus. Fibres of the muscle also arise from the concave inferior and outer aspects of the prominent delto-pectoral ridge (fig. 8, *d.p.tub.*).

The muscle is inserted into the sharp ridge leading distally from the coronoid lip of the humero-ulnar articulation, which lies in close apposition to the head of the radius.

In *Thylacinus*‡‡ the muscle arises from the posterior aspect of the shaft of the humerus by a linear origin, covered by the outer head of the triceps, though separated from it by a well marked external intermuscular septum. It merely clothes the outer aspect of the bone.

In Cuscus and *Phascogale*,‡‡ however, its fibres arise from the outer side of the shaft.

In *Dasyurus*§§ its origin is from both "posterior and anterior surfaces of the humerus," extending internally as far as the inner border of the bone, and externally as far as the insertion of the deltoid. Posteriorly it extends as high as the origin of the outer head of the triceps, which separates it from the teres minor insertion.

In Wombat‖‖ the muscle was "as usual, in position and attachments, winding round the bone below and external to the deltoid crest, lying in a deeply excavated sulcus in the humerus." Macalister states that "its position is similar in *Sarcophilus*, the Bandicoot, Opossum, Phalanger, Bennett's and Giant Kangaroo."‖‖

---

* xxi., page 300. † xxvii., page 246. ‡ xxii., page 37. § xxxviii., page 520. ‖ viii., page 395. ¶ xxvi., page 799. ** xi., page 215. †† xli., page 282. ‡‡ iv., page 11. §§ xxxvi., page 120. ‖‖ xxix., page 161.

In Koala* Young describes the muscle as arising from the whole of the outer surface of the shaft of the humerus, and inserted in common with the gleno-ulnar moiety of the biceps

In *Echidna*† the muscle is small and delicate, arising from the outer side of the shaft of the humerus, and closely embraced externally by supinator longus.

In *Ornithohynchus* also it is said to be intimately related to the supinator longus (v. infra, p. 42), and here it is innervated both by the N. medianus and M. radialis.‡ It is inserted into the radius.

In *Chlamydophorus*§ the muscle is large and, as in *Notoryctes*, is separated from the biceps by the deltoid tuberosity. Below, however, they are connected and inserted in company.

The insertion is radio-ulnar in *Bradypus tridactylus*,§ and there is a radial slip also in *Orycteropus*,‖ where also it receives a slip from the biceps.

In *Talpa*¶ its origin is from the upper part of the outer surface of the humerus and from the hook-like process on the outer tuberosity. It is ulnar in insertion.

In *Erinaceus*** and *Gymnura*†† it is inserted into the radius.

It is altogether absent in *Chrysochloris*‡‡.

In several Rodents§§ (*Dasyprocta*, *Lepus*, *Cuniculus*, &c.) the muscle is divided into two distinct parts, and is ulnar in its insertion.

M. triceps extensor antibrachii (figs. 1, 4, 5, 6, 7, and 8, *tr.*, *s.tr.*, *i.h.tr.*, and *o.tr.*) forms a relatively large muscular mass extending dorsad of the region of the axilla. Its origins are scapular and humeral, and the humeral origin is partially separated into "outer" and "inner" heads.

The scapular origin (figs. 6-8, *s.tr.*) is very extensive. It arises from the whole of the actual posterior border of the scapula from the glenoid origin to the recurved posterior angle of the vertebral border. It also arises from the whole length of the secondary or post-scapular spine of the scapula, and from the whole of the surface intervening between this and the posterior margin of the bone.

Part of this origin is crossed dorsally by the fibres of the spino-deltoid arising from the meso-scapular spine.

The humeral fibres of the muscle arise from the whole of the morphologically dorsal aspect of the humerus. The "outer" head (fig. 8, *o.tr.*) arises from the proximal part of this surface of the shaft, extending outwards as far as the upper end of the ectocondylar ridge, where, and above which, its outer marginal fibres are parallel with and closely applied to the outer margin of the brachialis anticus. Lower down the outer margin is in superficial apposition (behind the ectocondylar ridge) with the proximal margin of the anconeus externus. The highest part of

---

* lxxii., page 227. † xxxix., page 386. ‡ xxvi., page 804. § xxvii., page 247. ‖ xv., page 576. ¶ xi., page 215. ** xxvi., page 804. †† viii., page 395. ‡‡ xxvi., page 804. §§ xl., page 399.

the origin of this head extends upon the dorsal or radial aspect of the radial tuberosity, and there encroaches upon the outer aspect of the bone distal to the insertion of the infraspinatus muscle. From the latter it is limited by an oblique line running spirally round the neck of the humerus for a short distance. In the distal half of the brachium this head lies superficial to the lower part of the origin of the "inner" head of the muscle, and its inner margin is thinned out upon the surface of the latter, though not quite separate from it. About the middle of the brachium the musculo-spiral nerve winds forwards between the two layers (outer and inner heads) in order to reach the ventral aspect of the limb above the prominent part of the ectocondylar crest.

The "inner" head (figs. 6 and 7, *i.h.tr.*) is more massive than the "outer." Proximally it reaches up beyond the insertion of the teres major. In one specimen the tendinous layer on the ventral aspect of this head was found to extend upwards ventrad of the insertion of the teres major, while the proper fleshy fibres of the bend reached up dorsad of the same muscle. The ventral tendon was certainly of the nature of internal intermuscular septum, muscular fibres arising from its dorsal aspect, and I may hazard the conjecture that its prolongation upwards in front of the teres major represented the faint remnant of a coraco-brachialis muscle which is otherwise entirely unrepresented in this animal.

Short fibres of the inner head of the triceps fill up the great space in the lower part of the brachium between the humerus and the olecranon. These fibres are covered by the outer head, and the outer margin of this part of the muscle is in deep apposition with the proximal border of the anconeus externus muscle, from which indeed it is not very definitely separable. The scapular head forms a thick but superficial lamella of the muscle, which is inserted along the extensive convex edge of the recurved olecranon. A few of its most postaxial fibres adjacent to the latissimus dorsi terminate along with the latter in the aponeurosis of the forearm.

The fibres of the humeral heads of the muscle form a deeper fleshy stratum also inserted into the olecranon beneath the scapular fibres. They are only continuous with the latter at their insertion.

The question of the representation of the dorso-epitrochlearis muscle has already been discussed, and a summary of the morphology of this muscular element in mammals under the name of *M. anconeus quintus* will be found in a memoir upon the subject by Wenzel Gruber.*

* lviii., page 9, *et seq.*

The triceps seems to be a strongly developed muscle in all Marsupials.

In *Thylacinus* the origin of the scapular head is extensive, according to Cunningham,* reaching along the whole length of the posterior margin of the scapula. In most other cases, however, the scapular origin does not occupy more than a third or a half of that border, and there is in no case an extension of the muscle upon the outer surface of the bone such as is correlated in *Notoryctes* with the development of the post-scapular spine.

The outer and inner humeral heads are stated by Macalister† to be inseparable from each other in Marsupials, but this is by no means universal‡, nor is it so in *Notoryctes*.

The triceps in Monotremes is an exceedingly extensive and powerful muscle, especially in *Echidna*. The scapular part arises in the latter from a well-marked crest on the outer surface of the scapula, which extends dorsally from the lower (ventral) end of the scapula to near the vertebral border. This tricipital crest has been regarded by Flower and Gadow as the morphological post-scapular border, and this view has been elsewhere discussed by Dr. W. J. S. McKay and the writer.§ We cannot confirm Meckel's description of a segmentation of the scapular triceps into three parts‖ in *Ornithorhynchus*.

The outer humeral head in *Echidna* is probably represented merely by a small tendinous slip arising external to the origin of the supinator longus from the base of the radial tuberosity. It is separated from the very large inner humeral head by the musculo-spiral nerve. The inner head occupies the entire posterior surface of the shaft of the humerus (Mivart¶).

It is amongst the *Edentata* that we meet with the closest parallelism to the condition of the triceps in *Notoryctes*. This is owing to the very similar development in many members of the order of a second or post-scapular spine. A comparison between fig. 8 and Macalister's fig. 24,** representing the corresponding region in *Chlamydophorus*, is rather striking. But in *Notoryctes* I have not found that the scapular triceps is divisible, as in *Chlamydophorus*, into three portions; while in the latter animal again the humeral triceps is one and indivisible, and evidently proportionately smaller than in *Notoryctes*. In *Dasypus*†† there are two scapular origins, the largest being from the whole length of the post-scapular spine. In *Cyclothurus*,‡‡ where a post-scapular spine is present near the actual hinder margin of the scapula, there is no division of the scapular triceps into distinct heads. In *Bradypus* also it is undivided. Giebel§§ regards the post-scapular spine (well developed, *e.g.*, in *Myrmecophaga tetradactyla*) as the true morphological posterior border (post-scapular) of the scapula. Its development in the form of a second spine seems correlated with a very considerable development of the scapular triceps.‖‖

Certain Rodents exhibit an approach towards a post-scapular ridge, *i.e.*, a marked exaggeration of the outer or dorsal lip of the "axillary" border of the scapula. This is notable in *Arctomys*,¶¶ but I do not

---

* iv., page 11. † xxix., page 161. ‡ iv., page 11, and xxxvi., page 121. § lxiv. ‖ xxxvii., page 27. ¶ xxxix., page 386. ** xxvii., Pl. xv., fig. 24. †† xiv., page 538. ‡‡ xxvii., page 248, and xlvii., Pl. 22, fig. 18. §§ xviii., page 408. ‖‖ Cf., lxiv. ¶¶ xviii., Pl. 71, fig. 11, and xlvii., Pl. xxiv., fig. 14.

know whether it is there associated with a special development of the scapular triceps. Mivart and Murie note that in *Dasyprocta* (and in Rabbit, Hare, and Guinea-pig)* the usual three heads are present with the usual origin and insertions. The scapular head is large and arises partly from fascia over infraspinatus.

In *Talpa*† the triceps is large and tricipital. The scapular head arises from the glenoid end of axillary border or from three-fifths of the length of the infraspinous fossa. In the *Erinaceidae* the triceps is "enormous in comparison with the size of the animal."‡ It arises by a scapular and two humeral heads.

Among the *Carnivora* a post-scapular spinous ridge is figured by Giebel in *Ursus arctos*,§ while Windle‖ in the same genus describes the scapular triceps as arising from the "whole of the axillary border." Cuvier and Laurillard figure such a form of the scapular triceps in *Ursus Americanus*;¶ and in *Ursus meles*** they likewise figure a *double* scapular triceps, the hinder portion being long and slender (noted as a *fifth extensor*), and arising close to the vertebral end of the "axillary border" (and doubtless from the dorsal portion of such a tricipital ridge or post-scapular spine as is present in *Ursus arctos*.) This origin overlaps dorsally the origin of the teres major.

In some cases where such a posterior, or rather post-axial, sector of the scapular triceps is present it appears to be more or less closely associated with the dorso-epitrochlearis (Cuvier and Laurillard's fourth extensor; Wenzel Gruber's anconeus V.). Such a condition of partial union is noted by Galton as present in *Orycteropus capensis*††, and in *Dasypus sexcinctus*.‡‡

On the general morphology of the extensor mass in the arm in *Mammalia c.f.* memoir by Wenzel Gruber.§§

M. anconeus externus seu *quartus*, seu *epicondylo-anconeus* (W. Gruber) (figs. 8, 9, and 17 *an.e.*). This is a comparatively large muscle, somewhat rhomboidal in form, and arising from the back of the ectocondylar ridge of the humerus in its prominent lower third. Its fibres are directed backwards and distally towards the ulna, to be inserted into the base of the olecranon and the proximal half of the postaxial border of the shaft of the ulna.

Its attachment to the ulna is crossed by the belly of the M. extensor indicis et medii digiti, which runs along the shaft of the bone.

The proximal border is parallel with the lateral border of the humeral triceps, superficially with the outer head, but deeply it is in apposition with the short fibres of the inner head, from which indeed it is not absolutely separable by any very marked segmentation cleft.

Its distal border is parallel and in apposition with the ulnar border of the extensor carpi ulnaris (fig. 9, *e.c.u.*).

---

* xl., page 400. † xi., page 215. ‡ viii., page 395. § xviii., Pl., 72, fig. 5. ‖ lxvi., page 83. ¶ vi., Pl. 85-6. ** vi., Pl. 102. †† xv., page 578. ‡‡ xiv., page 539. §§ lviii., page 8, *et seq.*

According to Cunningham,* this muscle varies greatly in the different members of the order *Marsupialia*, in which, however, it is very generally present.

In *Thylacinus* he describes it as hardly existent, while in *Phascogale*, and especially in Cuscus, it is largely developed.

In *Myrmecobius fasciatus* Leche† describes it as especially strongly developed. From his figure it does not appear to be proportionately so largely developed as it is in *Notoryctes*.

In *Phalangista vulpina*‡ it extends over the upper two-fifths of the outer border of the ulna as a very considerable muscle.

In *Echidna* Westling§ notes the anconeus externus ("quartus") as arising from the dorsal aspect of the ectocondyle, and inserted into a depression on the external face of ulna (olecranon and shaft), extending distally as far as the extensores digit. com. and carpi ulnaris.

In *Ornithorhynchus* a well-developed anconeus externus is also present. According to St. John Brooks,‖ it arises in common with the extensor carpi ulnaris from the external condyle, and is inserted into the upper third of the ulnar shaft. (This author¶ regards the anconeus externus of the vertebrate forelimb as morphologically related more nearly to the extensor carpi ulnaris than to the inner head of the triceps, and as constituting along with the former the ulnar sector of the superficial layer of the extensor mass in the antibrachium. Its "tendency to unite with the triceps" he regards as a secondary, and not as a primary, characteristic. The condition in *Notoryctes* would agree equally well with either view of the affinities of the muscle, but the evidence from mere topographical relationship is of little value.)

In *Chlamydophorus*** the anconeus externus is comparatively small, and it is overlapped by the humeral triceps, and in *Tatusia* the condition is similar.†† Humphry†† notes that in *Cyclothurus* (*Myrmecophaga*) *didactyla* it extends down nearly the whole length of the outer surface of the ulna between the extensor carpi ulnaris on its outer side, and the flexores digiform and carpi ulnaris internally, these three muscles (four ?) forming an almost continuous sheet. In *Manis*, too, the same author describes the anconeus externus as large.

Amongst the *Insectivora* Dobson‡‡ notes the presence of the anconeus externus only in the *Talpidæ*. In *Talpa Europea* the muscle, according to Freeman,§§ consists of two parts, a posterior rounded fusiform fasciculus arising from tip of the styliform external condyle and inserted into the outer projection of the olecranon. The anterior portion is thin and fan-shaped, arises in common with the preceding, and "becoming aponeurotic as it passes over the extensor muscles of the forearm, is inserted into the prominent crest of the ulna."

Cuvier and Laurillard figure a well-developed anconeus externus in the Hedgehog as well as in the Mole.‖‖

The anconeus externus appears to be but slightly developed (generally absent ?) amongst Rodents. However, Cuvier and Laurillard figure the muscle in *Sciurus* (pl. 204) and in *Arctomys* (pl. 207), where it is indeed rather well marked.

---

* iv., page 12. † xxvi., page 806. ‡ xxxvi., page 122. § lxii., page 20. ‖ i., page 9. ¶ i., pages 1 and 13. ** xxvii., page 248. †† xxi., page 39. ‡‡ Quoted by Leche, xxvi., page 806. §§ xi., page 215. ‖‖ vi., Pl. 80, fig. 1 *u*, and Pl. 75, fig. 1 *u*.

The muscle, so far as I know, presents nothing worthy of note amongst the *Carnivora*.*

M. anconeus internus, seu *epitrochleo-anconeus* (figs. 6 and 7, *an. i.*). This forms a short, moderately thick, and somewhat rounded muscle, arising dorsad of the internal (ulnar) epicondyle (epitrochlea), and directed backwards to the concave aspect of the curved and beak-like olecranon, into which it is inserted not far from the tip. The fibres of the muscle are in series with those of the inner head of the triceps proximally. At its distal border there is a triangular intermuscular interval, bounded distally by the epitrochlear and olecranon heads of the M. flexor carpi ulnaris (figs. 6 and 7, *f.c.u.*), and proximally, of course, by the anconeus internus itself. [I found no trace of a fibrous arch uniting the two heads of the flexor carpi ulnaris, to which the distal border of the anconeus internus is attached in various other marsupials *(Cuscus, Dasyurus).*†]

As usual, the ulnar nerve passes down into the forearm under cover of the muscle.

The anconeus internus has been described in all Marsupials whose myology is recorded, and its character and relations seem much the same in all.‡

It is figured, as well as described, in *Dasyurus viverrinus* by Wenzel Gruber in his monograph upon this muscle§ ; *c.f.* also MacCormick.‖ Figures of the muscle also appear in Cuvier and Laurillard (*Macropus major*),¶ and in Galton's paper on the muscle (*Phascolomys*),** as well as in Cunningham's Memoir†† (Cuscus).

The muscle is also well developed in the Monotremes. It is described and figured in *Echidna* by Westling.‡‡ Mivart has not recognised it as a distinct muscular element, but Galton has both described and figured it on this genus.§§

In *Ornithorhynchus* the muscle has been described by Wood,‖‖ though Meckel does not refer to it, nor do Cuvier & Laurillard figure it. I find it a well-developed muscle in dissections by Dr. McKay, and Coues¶¶ also notes it as a muscle of considerable size (his "*Antanconeus*").

The nerve supply in *Echidna* is stated by Westling*** to be from the N. radialis profundus. In all other cases the nerve has been found to come from the ulnar nerve; even in *Ornithorhynchus*. Dr. W. J. S. McKay has informed me that he can corroborate the statement in reference to *Ornithorhynchus*, and with regard to *Echidna*, he finds that the nerve comes from the "nervus radialis profundus," as Westling states, but that in one case it came off from that nerve along with an ansal branch of communication between the ulnar nerve and the "nervus radialis profundus."

---

* Cf. vi. †iv., page 12, and xxxvi., page 122. ‡iv., page 13, gives various references. §lix., page 17, and Pl. ii., fig. 1. ‖xxxvi., page 122, and figs. 2, 6, and 8. ¶vi., Pl. 195, fig. 1 *u*. **xvii., fig. 3. ††iv., Pl. ii., fig. 4. ‡‡lxii., page 22, and Taf. iv., fig. 12 *E.a.* §§xvii., fig. 4. ‖‖lxix., page 497. ¶¶iii., page 150. ***lxii., page 22.

In *Chlamydophorus* Macalister* notes this muscle as "very large, and related as usual." The muscle is stated by Galton† to be well developed throughout the whole of the *Edentata*, and his paper, as well as Gruber's,‡ may be consulted for further information.

Dobson (quoted by Leche)§ notes the presence of the muscle in the *Talpidæ* only amongst *Insectivora*. Gruber, however,‖ describes it in several others, including *Erinaceus* and *Sorex*.

It is very largely developed in *Talpa*.¶

In Rodents it is almost invariably present as an independent muscle, and in the *Carnivora* also it is usually to be recognised as such.

The morphology of this muscle is treated of at length in Gruber's and Galton's papers already referred to.**

Muscles of the Forearm.

In describing the muscles upon the extensor aspect of the forearm and hand we may conveniently adopt the schematic classification suggested by Dr. Brooks†† on the lines laid down by Humphry.‡‡

According to this scheme we have to recognise three longitudinal sectors of the extensor mass in the forearm, each being further subdivisible into a superficial and a deep stratum. The three sectors are distinguished as radial, ulnar and intermediate, and the superficial elements of these may first be described.

Ordinarily among mammals the superficial radial sector consists of Mm. supinator longus and brevis and extensor carpi radialis, which may be segmented into "longior" and "brevior" portions. (The supinator brevis is regarded by Brooks as delaminated from the more superficial supinator longus. Its description will, however, be deferred until the more superficial muscles are noticed.)

M. supinator longus is unrepresented in *Notoryctes*.

This muscle is generally present in Marsupials, but it is lacking in *Sarcophilus*, according to Macalister.§§ Cunningham found it in *Thylacinus*‖‖ "very feebly developed," consisting only of a narrow fleshy band arising from the upper part of the ectocondylar ridge. In Cuscus and *Phascogale* it was relatively a very large muscle.¶¶ In *Dasyurus**** it is small and narrow, while in Koala††† it is enormous. In *Petaurista taguanoidis*‡‡‡ Haswell found it inserted into the scaphoid. Leche§§§ found it united with the extensor carpi radialis in *Myrmecobius*. Macalister‖‖‖ suspects that the muscle described by Owen¶¶¶ in *Perameles* as supinator longus is really an extensor carpi radialis. St. John Brooks**** holds that the muscle is absent in *Ornithorhynchus*, and Meckel†††† also omits all mention of it. Neither do Cuvier

---

* xxvii., page 248. † xvii., page 171. ‡ lix., *loc. cit.* § xxvi., page 808 ‖ lix., page 13. ¶ lix., page 14. ** lix. and xvii. †† ii., p. xv., and i., pp. 1, *et seq.* ‡‡ xxii., page 46. §§ xxx., page 19. ‖‖ iv., page 13. ¶¶ iv., page 14. *** xxxvi., page 123. ††† xxviii., page 130, and lxxii., page 228. ‡‡‡ xix., page 176. §§§ xxvi., page 810. ‖‖‖ xxix., page 164. ¶¶¶ xlv., page 13. **** i., page 9. †††† xxxvii.

and Laurillard figure it. But Coues* names as supinator longus the muscle which Brooks regards as extensor carpi radialis longior. Coues' view is certainly erroneous.

Mivart describes a supinator longus in *Echidna*,† though he inserts a query to the name; and the same muscle is also described and figured by Westling‡ as fused at its origin with the brachialis anticus, and as supplied by the median nerve along with the latter muscle.

In dissections by Dr. McKay I find no separation of supinator longus from brachialis anticus (in fact no satisfactory indication of a supinator longus at all) in *Ornithorhynchus*, while in *Echidna* there is a very well marked segmentation of a supinator longus parallel with and close to the brachialis anticus.

In *Chlamydophorus* and *Tatusia*§ the muscle is absent, as also in *Dasypus*‖; but in most *Edentata* it appears to be present.

It is absent in all *Insectivora* and *Rodentia*,¶ but generally present in *Carnivora*. It is absent, *e.g.*, in *Hyæna striata* and *Proteles*.**

M. extensor carpi radialis (figs. 6, 7, 9, 10, 12, and 17 *e.c.r.*) arises from the ectocondylar ridge and from the septa between it and the adjacent muscles.

It is a large fleshy muscle (indivisible into segments), ending in a stout tendon which descends dorsad of the prominent radial styloid and passes under cover of the extensor ossis metacarpi pollicis which crosses it just below the styloid. Still more distally it is crossed (close to its insertion) by the indicial extensor tendon. Its insertion is into the dorsal aspect of the base of the metacarpal of the third digit.

There is no trace of a second radial extensor, and the muscle present corresponds from its insertion rather to the ext. carpi rad. brevior. The entire absence of a portion of muscle or tendon representing the long extensor is doubtless correlated with the peculiar condition of permanent opposition and partial flexion of the metacarpals of both pollex and index in the highly modified manus of this animal.

Cunnigham notes that the fleshy bellies of the radial extensors of the carpus are completely amalgamated in *Phascogale*, though the tendons were separate. In Cuscus and one specimen of *Thylacinus* the same author found the muscles quite separate, while another specimen of *Thylacinus* resembled *Phascogale* in this respect.††

MacCormick‡‡ found in all the specimens of *Dasyurus* examined by him (and of *Phalangista?*) that the muscles were fused throughout, the single tendon being inserted into the metacarpal of the third digit. But in most marsupials its insertion is into the metacarpals of both second and third digits. Young found the muscles in Koala§§ fused in some cases, separate in others. Macalister‖‖ mentions one muscle only in *Macropus bennettii*, *Phascolomys sarcophilus*, *Phalangista*, and *Macro-*

---

* iii., page 153. † xxxix., page 386. ‡ lxii., pages 19 and 25. § xxvii., page 255. ‖ xiv., page 540. ¶ xxvi., page 810. ** lxxiii., page 191. †† iv., page 14. ‡‡ xxxvi., page 123. §§ lxxii., page 229. ‖‖ xxix., page 163.

pus major, but as inserted in these forms into both second and third metacarpal. He also notes a single tendon only in *Didelphys*, where Meckel describes a double muscle.* Both radial extensors are present in *Petaurista*.†

In *Echidna* Mivart‡ describes both long and short extensors, the former inserted into the scapholunar, and the latter into the third metacarpal. Westling gives a similar account.§

In *Ornithorhynchus* Brooks|| notes substantially the same arrangement, only the long extensor is inserted into the first metacarpal, and the ligaments on the dorsum of the carpus.

Coues' nomenclature¶ of the muscles of this region is different, but I do not think his view of the homologies can be upheld.

In *Chlamydophorus* there is only one radial extensor, but two tendons are present, according to Macalister,** inserted into metacarpals of index and medius. Hyrtl†† only gives the former insertion. Among other *Edentates* a like condition obtains to that noted by Macalister, but often only an insertion into the third metacarpal is found, *e.g.*, *Cyclothurus*‡‡ and *Orycteropus*.§§

Amongst the *Insectivora* the muscle is inserted into the second and third metacarpals in *Erinaceus Gymnura* and the *Talpidæ*. In *Chrysochloris* it is attached to second metacarpal only.||||

Amongst *Rodentia* it is almost invariably split into long and short extensors, inserted as usual|||| and similarly in various *Carnivora*.

The *intermediate sector* of the superficial extensor stratum is represented by the *M. extensor communis digitorum* (figs. 9, 17, *e.c.d.* 1, and *e.c.d.* 2). This muscle is represented by two fleshy bellies united at their origins from the distal portion of the ectocondyle. Fibres of each head also arise from the septum between the two, and from the septa between their common origin and that of the extensor carpi radialis in front, and of the extensor carpi ulnaris behind. The two bellies become separate in the lower part of the forearm. Opposite the radio-carpal joint their tendons pass together through a strong and well-defined fibrous sheath to enter the dorsum of the manus. The more radial of the two tendons (*e.c.d.* 1) runs distally on the dorsal aspect of the metacarpal of the third digit, and is inserted into the ulnar of the two slight tubercles on the prominent dorsal projection of the base of the ungual phalanx of that digit, side by side with the tendinous slip from the M. extensor indicis et medii digiti (*vide* infra), which is inserted into the radial of the two tubercles. The second (ulnar) tendon of the extensor communis (*e.c.d.* 2) is slightly the stronger, and the transition from broad fleshy belly of this part of the muscle to narrow rounded tendon is a very abrupt one. It passes through the same fibrous sheath as the first-named tendon, and is inserted into the radial angle of

---

* xxxviii., page 138. † xix., page 176. ‡ xxxix., page 387. § lxii., page 26. || i., page 9. ¶ iii., *loc. cit.* ** xxvii., page 255. †† xxiv., page 38. ‡‡ xxvii., page 256. §§ xxi., page 306. |||| xxvi., page 812.

the very broad base of the ungual phalanx of the fourth digit, which is indeed fused with the base of the claw itself.

In accordance with the peculiarly modified manus in *Notoryctes*, this muscle exhibits a marked reduction from the ordinary marsupial type.

In Koala* Young describes an insertion into each of the five digits. This, Cunningham remarks,† is exceptional, as "in the great majority of marsupials its insertion is limited to the four inner digits."

[I do not think that Young's interpretation of the extensor group of muscles in Koala is a correct one. In several points it differs markedly from Macalister's brief account. I have dissected a young specimen in order to decide certain differences. I find that the extensor communis digitorum arises from the ectocondyle, and divides above the dorsal carpal ligament into three tendons, one for the medius, another for the medius and annularis, and a third, which is very broad in the dorsum of the hand, mainly for the minimus, but partly also for the annularis. The fibres of the last two tendons thus undergo a partial decussation. The first-named tendon (for the medius) passes through a separate theca. No tendon goes to either index or pollex, but the proper medial tendon is connected by a strong and somewhat rounded transverse vinculum with the indicator tendon.]

In *Thylacinus*, according to Cunningham, the muscle is trifid in the forearm, each tendon subsequently splitting, the six tendons being distributed to the four ulnar digits.

In *Echidna* Mivart‡ describes the muscle as bicipital, one head being ulnar in origin. He only notes tendons of insertion into the three middle digits, while Westling§ describes a tendon going to the terminal phalanx of each of the five digits.

In *Ornithorhynchus* the muscle is not bicipital, and arises only from the ectocondyle, its terminal tendon expanding on the back of the hand, and sending a slip to the distal phalanx of each of the five digits (Brooks‖).

In *Chlamydophorus*¶ the muscle passes unbroken beneath the annular ligament, and then goes to be inserted into the second, third, and fourth digits.

The precise insertion varies in *Edentates;* in several cases it is into second, third, and fourth digits, as in *Chlamydophorus*, but it may be into second and third, third and fourth, or third only.

In *Erinaceus*, which is so very slightly specialised, it is inserted into each of the five digits.

In *Chrysochloris*** the insertion is into the third and fourth digits only. In this animal, it will be remembered, the manus is modified in somewhat similar manner as in *Notoryctes*.

No *M. extensor minimi digiti (extensor secundus digitorum auct.)* is present.

Such a muscle, designated by Macalister†† as "extensor secundus digitorum," is constantly present amongst other Marsupials, and is generally inserted into the fourth and "fifth" digits, rarely into the

---

* lxxii., page 229. † iv., page 15. ‡ xxxix., page 387. § lxii., page 26, and fig. 14. ‖ i., page 8. ¶ xxvii., page 256. ** xxvi., page 813. †† xxix., page 164.

fifth only, and sometimes (*Sarcophilus*, Bennett's, and Giant Kangaroo*) into the third, fourth, and fifth digits.

In Koala I found the muscle with usual origin passing through a special theca, its tendon splitting into two, which pass on a deeper plane than extensor communis. The ulnar of the two tendons goes to minimus, the more radial is joined by a fibrous expansion from the tendon of the extensor medii proprius, and then passes to the annularis.

The muscle is present both in *Ornithorhynchus* and *Echidna*.†

For conflicting opinions regarding the homology of this muscle see infra (page 47).

The *ulnar sector* of the superficial stratum of the extensor mass is represented by the M. extensor carpi ulnaris. (Dr. Brooks holds that the M. anconeus quartus is likewise a part of this sector, but I have preferred to describe it along with the extensor mass of the brachium.)

M. extensor carpi ulnaris (figs. 9, 17. *e.c.u.*) ("ulnaris externus") arises by a narrow pointed origin from the lower part of the ectocondyle between the preceding muscle and the anconeus externus, with whose distal border it is in close apposition. Fibres of the muscle also arise from the intermuscular septa between it and adjacent muscles. It broadens out as it descends in the forearm, narrowing again towards the wrist into a moderately strong tendon. This passes beneath a fibrous arch, which binds it down to the back of the lower end of the ulna and ulno-carpal ligament, but immediately distal to this it turns abruptly inwards (*vide* fig. 17), winding almost under cover of the base of the great claw of the fourth digit to reach the dorsum of the diminutive fifth digit, to be inserted into the rudimentary metacarpal bone of the latter.

Among the Marsupials this muscle is sometimes split into two. Thus Cunningham found two distinct factors in *Phascogale* and in a specimen of *Thylacinus*,‡ while in *Dasyurus*§ MacCormick found two quite distinct tendons of insertion. In *Sarcophilus*|| Macalister also describes a second element which he identifies as *ulnaris quinti*, and which corresponds, according to MacCormick, to one of the tendons he found in *Dasyurus*.

The muscle is sometimes merely ectocondylar and fascial in origin (*Sarcophilus*, *Didelphys*, *Phalangista*, *Dasyurus*), but in others an ulnar origin is also present (*Phascolomys Macropus*, *Peramelis*, *Phascolarctos*)¶. In *Phascolarctos* I found it ectocondylar and fascial only, its tendon passing through a special theca behind lower end of ulna, and then winding round wrist to *palmar* aspect of fifth metacarpal, into which it is inserted close beside tendon of flexor carpi ulnaris, to which it is in this animal functionally accessory.

The usual insertion in this order is into the base of the fifth metacar-

---

* xxix., page 164. † i., page 10, and fig. 6; lxii., page 27. ‡ iv., page 15. § xxxvi., page 126. || xxx., page 19. ¶ xxix., page 164; xxxvi., page 126; and lxxii., page 229.

pal, *e.g.*, in *Phascolarctos*, *Phalangista maculata*, *Thylacine* (sometimes), *Phascolomys*, and *Myrmecobius*.* But where there are two tendons of insertion one may pass to the os hamatum, while the other goes to the fifth metacarpal, as in *Phascogale* and one specimen of *Thylacinus* (Cunningham), or as in *Dasyurus* and *Sarcophilus*,† both tendons pass to the metacarpal bone of the fifth digit.

In *Echidna* Mivart‡ notes the muscle as both ectocondylar and ulnar in origin, *i.e.*, from olecranon. Westling§ mentions also a fleshy origin from the ulnar shaft. The latter I have not been able to verify from dissections. Mivart merely gives as its insertion the outer side of the dorsum of the fifth digit, but Westling describes it as joining the extensor tendons of the fifth digit, and being inserted into the lateral borders of the middle and base of the terminal phalanx. Wenzel Gruber,‖ on the strength of Mivart's observations, holds that in *Echidna* the "ulnaris externus" is simply an "ulnaris digiti quinti."

In *Ornithorhynchus* Brooks¶ found the origin ectocondylar only, and that the tendon of insertion passed along with that of the extensor minimi digiti, and divided at the wrist into two. Of these one was inserted, as Westling found the tendon inserted in *Echidna*. The other, deeper, was joined by a slip from the abductor minimi digiti, and was then inserted into the base of the proximal phalanx of the little finger. Here also, therefore, as Brooks remarks, the muscle is converted into an ulnaris quinti digiti.

This description is remarkably different from that given by Coues,** who specially states that, while all other muscles lying on the forearm are more or less condylar in origin, this one "arises wholly from the ulna." Further, he states that it is inserted into the base of the fifth metacarpal, "partaking somewhat of the general tendency to aponeurotic expansion that characterises all the tendons coming down on the back of the hand."

Brooks' view is in agreement with Meckel's. The latter,†† in mentioning the muscles attached to the ectocondyle, and after noting the extensor communis digitorum, proceeds:—"Sequitur hunc latus et crassus, ulnaris externus, phalangi primæ digiti quinti insertus."

Coues has plainly taken for extensor (his "flexor") carpi ulnaris what Meckel and Brooks describe as "extensor indicis et pollicis," while he has taken the true extensor carpi ulnaris for extensor minimi digiti, apparently entirely overlooking the real extensor minimi, which lies more deeply. This author's description of the mode of ending of the extensor tendons is extremely vague and unsatisfactory. In particular, I cannot understand his statement that the tendon of *his* "flexor" ("extensor" of ordinary anatomists) carpi ulnaris is inserted into the fifth metacarpal. As a matter of fact, the tendon of the muscle in question does not pass at all near to the fifth metacarpal, but, as Brooks describes it, passes beneath the posterior annular ligament in the same compartment with the tendon of the extensor communis digitorum, and on the back of the hand distributes slips to the dorsal expansions

---

* lxxii., page 229; iv., page 15; xxix., page 164; and xxvi., page 816.
† iv., page 15; xxxvi., page 126; and xxx., page 19. ‡ xxxix., page 387.
§ lxii., page 27. ‖ lx., page 24. ¶ i., page 9. ** iii., page 154. †† xxxvii., page 27.

upon the pollex, index, and medius; hence Meckel's name for it of extensor pollicis et digiti indicis.

I have satisfied myself by dissection that the accounts given by Meckel and more fully by Dr. Brooks are correct descriptions, and there can be little doubt that the muscles are correctly named in their writings. It may be remarked that the quite superficial fleshy and aponeurotic origin from the ulna of the extensor pollicis et indicis reminds one of the origin of the human extensor carpi ulnaris. Here, however, the resemblance ends. It may also be noted that in *Echidna* the ulnar origin of the former muscle is not superficial, as it is in *Ornithorhynchus*, being overlapped by the olecranon fibres of the extensor carpi ulnaris, which lie close up to the posterior border of the ulnar shaft. Accordingly, there is a superficial resemblance between the ext. carpi ulnaris in *Echidna* and the extensor pollicis et indicis in *Ornithorhynchus*, so far as the relations of their fleshy bellies are concerned; but the homologue of the latter muscle in *Echidna* will be found beneath the former.

In *Chlamydophorus** the muscle is very weak, ectocondylar in origin, and inserted into metacarpal V.

In *Orycteropus*,† origin ectocondylar, insertion by two slips into metacarpals IV. and V.

In *Dasypus sexcinctus*,‡ ectocondylo-ulnar in origin, insertion V. metacarpal.

In *Bradypus gularis*§ two muscles are present; one ectocondylar inserted into metacarpal IV., the other, ectocondylo-ulnar (mainly ulnar) in origin, inserted into metacarpal V.

In *Cyclothurus*,§ also two muscles; one ectocondylar only, inserted into metacarpal III.; the other, ectocondylo-ulnar (mainly ectocondylar), inserted chiefly into metacarpal V., but sending a delicate slip to metacarpal IV.

In *Manis*,§ also two muscles; one, ectocondylo-ulnar in origin, is the smaller, and is inserted into the palmar surface of metacarpal V.; the other—more internal—arises from the ectocondyle, "between the preceding and the extensor communis, and divides a little above the wrist into two broad tendons; the outer and smaller of these is inserted into the outer side of metacarpal V., and the inner is continued along the outer side of digit IV. to the terminal phalanx." Humphry remarks in reference to this arrangement that the three elements just described in *Manis* correspond to the peronei in the hind limb, and he proceeds—"In the forelimb the three muscles are in several animals blended into one, the extensor carpi ulnaris. In others there are two—the extensor carpi ulnaris, constituting the homologue of the peroneus brevis and longus, and the extensor minimi digiti, which may pass to two or more digits, constituting the homologue of the peroneus tertius. All these, together with the extensor digitorum, belong to what I describe as the 'superficial layer.'"|| Against this view St. John Brooks maintains that the extensor minimi digiti appertains not to the superficial stratum at all, but to the deep or extensor brevis stratum, such as is found in *Hatteria*. Upon this question *c.f.* Brooks' papers and discussion on his views.¶

---

* xxvii., page 257. † xv., page 583. ‡ xiv., page 543. § xxii., page 46. xxii., page 46. ¶ i., pp. 1 *et seq.*, and lxxii., pp. xv. and xix.

M. supinator radii brevis (figs. 16 and 17, *s.r.b.*). (This muscle is systematised by Dr. Brooks* as a delaminated portion of the radial sector of the superficial extensor stratum.)

It takes origin from the lowest part of the ectocondyle by a narrow origin, and is inserted into the outer surface of the shaft of the radius as far distally as the insertion of the M. pronator radii teres, encroaching upon both dorsal and palmar aspects of the bone. The posterior interosseous nerve (N. radialis prof.) appears at its dorsal border between it and the extensor ossis metacarpi pollicis.

The muscle is relatively well developed in *Notoryctes*, occupying three-fifths of the shaft of the radius, and it is deeply placed under cover of the superficial extensor muscles.

Cunningham notes the muscle as feebly developed in the three Marsupial forms dissected by him,† but Macalister notes it as well developed in Koala‡, occupying two-fifths of the shaft of the radius, in Wombat as occupying two-thirds of the bone, in the Tasmanian devil, Wallaby and Giant Kangaroo one-third, and in the Opossum only the upper fourth.§

In *Dasyurus* it is limited to the upper fourth,|| and MacCormick here notes an origin from the orbicular ligament of the radius. In no Marsupial has an ulnar region been described.

In *Echidna*¶ the muscle is purely condylar in origin, and has an extensive insertion into four-fifths of the radius.

In *Ornithorhynchus* it also possesses a condylar origin only, but its insertion is much less extensive, viz., into the upper third of the external border, and slightly into the anterior surface of the radius (Brooks**).

In *Chlamydophorus* the supinator brevis is poorly developed, and it is absent in *Tatusia*, but in several other Edentata it is large, *e.g.*, *Cyclothurus* and *Pholidotus*.††

It is absent in the *Talpidæ*‡‡ amongst the *Insectivora*, but present in the *Erinaceidæ*.§§ It is present also in *Rodentia*|||| and *Carnivora*.

The deep stratum of the extensor muscle of the antibrachium is represented in *Notoryctes* by two muscles. The first is *M. extensor ossis metacarpi pollicis* (figs. 9-12 and 17 *e.m.p.*). This is a broad muscle arising from both bones of the forearm between the supinator brevis on the radial, and the extensor indicis on the ulnar side, and extending as far proximally as the lower border of the anconeus externus, or even beneath it. At the wrist the muscle narrows and gives place to a fine tendon, which escapes obliquely from under cover of the common extensor of the digits, and, crossing the tendon of the extensor carpi radialis, it winds round the summit of the radial styloid and passes

---

* i., page 1. † iv., page 16. ‡ xxviii, page 130. § xxix., page 165, || xxxvi., page 128. ¶ xxxix., page 387. ** i., page 9. †† xxvii., page 255. ‡‡ xxvi., page 811. §§ viii., page 395. |||| xl., page 400.

further obliquely on to the apparent palmar (but still morphologically dorsal) aspect of the carpus to reach the base of the metacarpal bone of the pollex, into which alone it is inserted.

In Cuscus Cunningham found this muscle partly subdivided, one slip being inserted into the trapezium. He regards this as corresponding to the separation in the human subject of an extensor primi internodii pollicis. In *Thylacinus* the subdivision was complete, while the condition in *Phascogale* resembled that in Cuscus.* A like condition is noted both by Young† in Koala, and by Macalister also in that animal, as well as in the Wombat and Tasmanian devil and others.‡ The characters of the muscle in Koala are rather striking. It has the usual radio-ulno-interosseous origin. Halfway along the forearm its radial border developes a tendon which almost immediately separates from the rest of the muscle. This tendon is of even width and much slenderer than the broad flat tendon of the rest of the muscle, which begins just above the wrist. Both tendons pass through a special fibrous theca at the wrist, crossing the supinator longus and radial extensors of the carpus. The long slender tendon is inserted into the radial border of the metacarpal of the pollex, and lies close to but unconnected with the abductor brevis pollicis. The thick, strong tendon of the rest of the muscle is inserted into the trapezium.

Extensor profundus in *Petaurista taguanoides*§ consists of extensor secundi internodii pollicis and extensor medii digiti, the latter connected also with the second and fourth digits.

In *Dasyurus*|| MacCormick found only the pollicial attachment. So also Sidebotham in *Chironectes.*¶ In *Myrmecobius* it is attached only to the trapezium.**

According to Carlsson (quoted by Leche),** the insertion in *Didelphys* is into the first metacarpal and into the "præpollex."

In *Echidna*†† Mivart describes it as a delicate muscle, interosseo-ulnar in origin, pollicial only in insertion. It is closely associated with the common extensor, according to Westling.‡‡

Brooks found practically the same condition in *Ornithorhynchus.*§§

In *Chlamydophorus* the muscle is very large, ulnar in origin, and inserted into the metacarpal of the pollex. It is very much the same in *Tatusia* and *Dasypus*, but in *Cyclothurus* it is "humeral in origin, and is inserted into the ossicle, which is the rudiment of the first metacarpal, or "of trapezium and others," according to Humphry. In *Orycteropus* it is inserted into the trapezium only, and into this bone and partly into the first metacarpal in *Myrmecophaga.*||||

Dobson does not mention the muscle in *Gymnura*,¶¶ and according to Leche it occurs in all except this Insectivore.

Leche quotes from Carlsson to the effect that in *Castor* and *Rhizomys* besides the usual insertion (into the pollicial metacarpal) there is a tendinous slip to the praepollex, and in *Cercolabes* the latter is the only insertion.***

M. extensor indicis et medii digiti proprius (figs. 9, 11, 12, and

---

* iv., page 15. † lxxii., page 229. ‡ xxviii., page 431, and xxix., page 164. § xix., page 176. || xxxvi., page 126. ¶ liii., page 10. ** xxvi., page 817. †† xxxix., page 387. ‡‡ lxii., page 28. §§ i., page 9. |||| xxvii., page 258, and xxii., page 48. ¶¶ viii. *** xxvi., page 818.

17, *e.i.m.*). This second deep extensor arises from the posterior aspect of the shaft of the ulna by a narrow, pointed, fleshy belly, which extends upwards on the bone as far as the base of the olecranon, from which its highest fibres arise. The muscle covers the attachment to the shaft of the ulna of the anconeus externus, and in the distal part of the forearm it is directed obliquely towards the radius under cover of the extensor carpi ulnaris, so as to enter the same fibrous compartment of the dorsal annular ligament which transmits the tendons of the extensor communis digitorum. Still running obliquely its tendon passes beneath the tendons of the latter muscle, and comes to lie by their radial side. It then divides into two slips, the stronger of which passes to the dorsum of the index, where it is inserted, partly by lateral expansions into the base of the proximal phalanx and partly by a direct prolongation of itself into the base of the ungual phalanx. The other (weaker) division of the tendon is inserted into the radial of two slight tubercles on the prominent dorsal projection of the base of the ungual phalanx of the third digit.

M. extensor secundi internodi pollicis (extensor pollicis longus) is unrepresented, or rather the above muscle is the sole representative of the muscular mass from which the extensor secundi is typically differentiated.

In *Thylacinus* and *Phascogale*, according to Cunningham, there is a single muscular mass sending tendons to pollex, index and medius, which he designates as extensor secundi internodii pollicis. It is of course the equivalent of the muscle now under consideration, with the addition of a pollicial division.

In *Cuscus* the author just mentioned found the same mass represented by two distinct muscular factors connected respectively with pollex and medius.

The origin of the compound muscle in *Thylacinus* and *Phascogale* resembles that in *Notoryctes*. There "it springs from the radial side of the olecranon and from the upper third of the posterior border of the ulna."*

Macalister† describes an extensor secundi internodii pollicis arranged "as usual" in Koala, but Young‡ could find so such muscle in that animal, nor did he find any such indicator muscle as Macalister also describes "giving a filmy slip to the pollex." Young expressly says that "the thumb has no special extensor of the phalanges beyond the slip derived from the common extensor."

Both authors describe an extensor secundus digitorum supplying the fourth and fifth digits, and the extensor medii digiti was conjoined with this in Young's dissections, but separate in Macalister's. The slips to the fourth and fifth digits Young holds to represent the extensor minimi digiti. It arises from the shaft of the ulna along with the extensor medii digiti (*cf.* page 44).

I am strongly of opinion Young has described, as part of the ex-

---

* iv., page 16. † xxviii., page 131. ‡ lxxii., page 229.

tensor communis, those muscular elements which Macalister has rightly recorded under the names of *extensor secundi internodii pollicis* and *indicator* respectively.

As has already been mentioned (p. 44), Young states that the common extensor is inserted into all five digits, an arrangement which Cunningham has pronounced to be unusual amongst marsupials. Macalister, on the other hand, passes over the common extensor in Koala as arranged "as usual." And when we look at Young's description in detail, we note that he found the two radial tendons of his common extensor passing beneath the annular ligament in a separate compartment from the others, and going to the pollex and index. Are these not in all probability Macalister's extensor secundi and indicator together? This explanation would largely harmonise the discrepancies between the statements of these two observers.

I have verified by careful dissection the accuracy of Macalister's description. I find that an extensor pollicis longus (secundi internodii) is undoubtedly present. It is separable from the rest of the deep extensor stratum, except high up at its origin from the olecranon, where it is only partially separable from the fibres of the indicator muscle. The latter arises from the proximal part of the ulnar shaft and the aponeurosis covering it. Distal to this again, and separated from it by a small bare area of the ulnar shaft, is the origin of the extensor medii digiti proprius. Extensor pollicis longus passes through a special theca, and opposite the metacarpal its long and strong tendon is connected by a broad, flat, tendinous vinculum with the indicator tendon. It passes to the usual insertion. The tendons of the indicator and of the proper extensor of the middle finger pass through a common fibrous compartment beneath the dorsal carpal ligament.

In his Monograph on the extensor indicis proprius, &c., Wenzel Gruber* states that in a specimen of *Phascolarctos cinereus* he found an extensor pollicis longus (secundi internodii pollicis), an extensor indicis proprius, and an extensor digiti medii proprius. The first-named had a special sheath in the dorsal carpal ligament, while the other two passed beneath that ligament in a common sheath, with that tendon of the common extensor of the digits going to the index. The arrangement here described is very similar to that I have just noted in Koala. But in my specimen there was no tendon of the common extensor going to the index at all, hence the indicator and extensor medii tendons were alone in their theca.

In *Dasyurus*† MacCormick found a small and fusiform extensor secundi internodii pollicis arising from the radial side of the olecranon and overlapping the lower part of the insertion of the anconeus externus, and thus corresponding in part to the origin of the extensor indicis et medii digiti in *Notoryctes*. He also found a muscular mass in series with the extensor secundi, and arising from the posterior surface of the ulnar shaft. It accompanied the extensor secundi under cover of the extensor communis, and divided into slips for the second, third, and fourth digits. It was very variable in size and connections. Sometimes the slip to the fourth digit was absent, and sometimes the indicial part was a distinct muscle.

---

* lxi., page 46. † xxxvi., pages 127-8.

In *Sarcophilus** Macalister describes an "extensor indicis" giving slips to second, third, and fourth digits, in addition to an extensor secundi internodii pollicis, as in *Dasyurus*. The author views this series of slips as forming a third group of extensors of the digits. His second group, or extensor secundus digitorum, is constituted by the homologue of the human extensor minimi digiti, which in *Sarcophilus* arises with the extensor communis, and supplies tendons to the third, fourth and fifth digits.†

In Wombat,* extensor pollicis longus is present, but the extensor indicis is absent, and the extensor secundus digitorum supplies only the fourth and fifth digits.

It is at least difficult to reconcile this overlapping of the series of slips from Macalister's extensores secundus and tertius respectively, with Brooks's view‡ that the extensor minimi digiti is simply a displaced element of the extensor brevis series of slips which form originally an *extensor profundus* in the forearm.

In *Chironectes*§ an extensor secundi internodii pollicis is present, giving slips to both pollex and index, and a like condition obtains in *Myrmecobius*||.

In *Ornithorhynchus* Dr. Brooks, following Meckel,¶ has described an "extensor indicis et pollicis," giving tendons to pollex, index, and medius. It is large, ulnar in origin (extending up to and upon olecranon), and it is subcutaneous for a large part of its extent. This muscle is plainly the one noted by Coues** under the name of "flexor" (extensor) carpi ulnaris, though the insertion given by him is inexplicable to me. I have already alluded (p. 46) to the confusion introduced by Coues' unfortunate statements. I have made dissections which fully corroborate Dr. Brooks' description in almost every detail. Coues' description of this region must, therefore, be put aside as erroneous.

In *Echidna* neither Mivart†† nor Westling‡‡ has described any deep extensor, save the extensor ossis metacarpi pollicis. Indeed, Mivart expressly states that neither extensor secundi internodii pollicis nor extensor indicis are present. I have already (p. 47) referred to the presence of such a muscle in dissections I have made of the forearm of *Echidna*. It is quite a large muscle, arising from the proximal half of the dorsal aspect of the shaft of the ulna and from the base of the olecranon. Its origin upon the shaft of the ulna is parallel with that of the extensor ossis metacarpi, which indeed is slightly overlapped by it. It is largely covered at its origin by the origin of the extensor carpi ulnaris, and under cover of this the upper pointed end of its origin touches the insertion of the anconeus externus. Below, the muscle passes beneath the extensor communis, which position it occupies for the rest of its course, hence in Westling's figure it does not come into view. On the dorsum of the hand its tendon flattens out beneath the expansion of the common tendon which it joins, but fibres of it may be traced to all the four outer digits.

Thus the condition in *Echidna* is essentially the same as that in *Ornithorhynchus*. It is probable that the muscle just described is represented in Westling's account by the deep head of the extensor communis

---

* xxix., page 164. † Cf., also iv., page 17. ‡ i., page 14. § liii., page 10. || xxvi., page 818. ¶ i., page 10, and fig. 6; lxii., page 27. ** iii., page 154. †† xxxix. ‡‡ lxii.

digitorum of that author. I found the tendons separable from those of the extensor communis as above stated, hence I take it to be a true deep extensor muscle.

The condition of the corresponding muscle in *Chlamydophorus* is thus described by Macalister* :—" Extensor indicis (' quamvis etiam ad pollicis fasciolam fibrosam ablegaret, quae sola pollicis extensioni sufficere debet ') arises high up from the ulna as high as the olecranon ; it is very large, larger than its neighbour the extensor ossis metacarpi pollicis. I found its main tendon passing as usual to the dorsum of the index, but a broad slip of fascia stretches along the dorsum of the thumb to the last phalanx, justifying the words of Prof. Hyrtl before quoted."

In *Tatusia* the same author found it also exceedingly large and strong, and here it ended in two tendons inserted into the index and medius. So also in *Orycteropus*.†

In *Dasypus*‡ the tendons are inserted into the index and pollex. In *Bradypus (didact* and *tridact)*§ the insertion is into the index alone, and in *Manis (Philodotus*, Macalister) *Dalmanni*)§ into the terminal phalanges of each of the first three digits.

In *Manis multiscutatus* Macalister|| found no long extensor indicis, but the extensor brevis digitorum on the back of the carpus was indicial in its insertion. He found the muscle ulnar in origin and pollicio-indicial in insertion in *Myrmecophaga*.

In *Edentata* separate and distinct extensors of the thumbs are rarely present, if we exclude the extensor ossis metacarpi as an abductor longus. Macalister notes the extensor pollicis longus (secondi intermedii) as a very small muscle in *Myrmecophaga* and *Manis*.¶

Among the *Rodentia* the extensor indicis is present in many forms, amongst others in *Hystrix*, *Arctomys*, *Castor*,** *Cavia*, *Lepus*, and *Dasyprocta*.†† Of these it sends a tendon also the pollex in *Lepus*†† and *Castor* (usually)**, so that the muscle represents the extensor secundi internodii pollicis as well. In *Dasyprocta* and others the extensors of the thumb are absent.

In *Capromys*‡‡ a special extensor secundi internodii pollicis is present along with the extensor indicis.

In *Chrysochloris* among the Insectivora Dobson found extensor indicis as a single muscle, so also frequently in *Erinaceus*.§§

For further details of the morphology of this muscle *cf.* Gruber's monograph.|||

Muscles of flexor aspect of forearm are four in number.

M. pronator radii teres (figs. 6, 7, 10, 11, 12, and 16, *p.r.t.*) is a muscle of considerable size, and forms the preaxial member of the group of muscles arising from the entocondyle. From its origin onwards it lies partly under cover of the flexor carpi radialis, but a strip of it is superficial. Its origin is partly

---

* xxvii., page 258. † xv., page 581. ‡ xiv., page 542. § xxii., page 49. and Pl. 252, fig. 1. || xxxv., page 506 ; Cf. also, xvi., page 252. ¶ xxxv., page 506. ** xxxviii., page 551. †† xl., page 405. ‡‡ Dobson quoted by Leche, xxvi., page 819. §§ lxi., page 45. ||| lxi.

fleshy and partly tendinous from the entocondyle, and its fibres pass distally to be inserted into the shaft of the radius on the palmar aspect of its distal fourth. It overlaps the insertion of the biceps, and the large median nerve passes under cover of it.

The *M. pronator quadratus* is entirely absent.

I am not aware of any other Marsupial in which the pronator quadratus is absent, and in many it occupies the whole length of the interosseous space,* *e.g.*, in Wallaby and *Perameles*.

The coronoid head of the pronator radii teres is never present in any Marsupial, and its general characters in the order are very constant, varying chiefly in size and extent of insertion into radius. In some cases (Cuscus†) it is inserted into the distal half of the shaft, in others (*Thylacinus* and *Dasyurus*†) into the middle third or so of the radius, and in *Macropus*‡ into the upper third.

Both in *Ornithorhynchus* and *Echidna* the pronator teres is very strongly developed, is entocondylar in origin, and is inserted into the radial shaft as low as the wrist.

There is no trace of a pronator quadratus in the *Monotremata*.

Amongst *Edentata* the condition of the pronator quadratus is very variable.

In *Chlamydophorus*§ Macalister found the pronator quadratus represented by a fibrous band, whilst Hyrtl found no trace of it.

It is rudimentary in *Tatusia*, absent in *Pholidotus* and *Dasypus*,‖ while in *Orycteropus*¶ Galton found it occupying the whole interosseous space, though Humphry found it small. Galton found it in *Cyclothurus*** as in *Orycteropus*.

Macalister notes it as absent in *Manis*, and as reaching the whole length of the forearm in *Myrmecophaga*††.

The pronator teres in *Edentata* is always inserted into the distal part of the radial shaft for an extent varying from one-third (*Chlamydophorus*) to two-thirds (*Manis*). The coronoid head is invariably absent.**

Macalister's paper‡‡ on the Pronator muscles in Vertebrates may be further consulted on the morphology of these muscles.

M. flexor carpi ulnaris (figs. 6, 7, 9, 12, 13, 14, and 15 *f.c.u.*). This muscle arises by two very distinct heads—one from the olecranon, the other from the entocondyle. Just above the wrist these bellies unite to form a strong tendon, which is first developed upon the superficial aspect of the muscle, and is united with the overlying aponeurosis of the tendon of insertion of the latissimus dorsi. The tendon is inserted into the elongated pisiform bone near to its base (figs. 14 and 15).

At their origin the two heads of the muscle are in relation with the distal border of the M. anconeus internus, and together

---

* xxxiii., page 337. † iv., page 17, and xxxvi., page 130. ‡ xxix., page 162. § xxvii., page 253, and xxiv., page 39. ‖ xxvii., page 253, and xiv., page 546. ¶ xv., page 586. ** xvi., page 253. †† xxxv., page 504. ‡‡ xxxiii., page 335.

with it they limit a small triangular interval, at the bottom of which the ulnar nerve may be found.

The muscle is relatively a very powerful one. As has already been mentioned, it is covered by a strong aponeurosis, which forms the continuation of the tendon of insertion of the M. latissimus dorsi.

The arrangement of this muscle in *Notoryctes* is practically identical with that found by Cunningham in *Thylacinus* and *Phascogale*,* and is fairly typical of marsupials generally. In the three forms examined by the last-named author the insertion was into the pisiform in each case; so also is the case in *Sarcophilus*† and *Dasyurus*.‡ In *Phascolomys*† it is inserted into the fifth metacarpal, and in *Phascolarctos*§ into both the above-mentioned bones as well as into the os hamatum. In *Chironectes* into pisiform and fifth metacarpal.‖

In *Macropus*† the condylar origin is lacking.

In *Echidna* the muscle is "enormously wide" (Mivart¶), arising not only from entocondyle and olecranon, but also from the inner border of the ulnar shaft as far as the wrist. Mivart states that its tendinous surface "receives the tendon of the first part of the latissimus dorsi; and the two muscles becoming thus ultimately united, are together inserted into the pisiform bone." Westling, however, distinguishes this "first part of latissimus" from the rest as a "*dorso-antebrachialis*,"** the latissimus dorsi itself being arrested at the entocondyle. As I have indicated above (p. 16), this "dorso-antebrachialis" is inseparable from the latissimus in *Notoryctes*, and indeed forms the only insertion of the muscle, *cf.* also Coues' description in *Ornithorhynchus*.††

The flexor carpi ulnaris in *Ornithorhynchus* resembles that in *Echidna*. The fibres of its strong tendon are completely arrested at the pisiform bone; it is only quite indirectly that it has an attachment to the bases of the fourth and fifth metacarpals, as Meckel describes it;‡‡ hence Leche is mistaken in classifying its insertion with others as deviating from the typical mode.§§

Amongst the *Edentata* the muscle varies considerably in different forms, from a slender separate muscle with two scarcely separate heads, inserted into pisiform in *Chlamydophorus*, to an enormous mass of four segments, condylo-pisiform, posterior ulno-pisiform, anterior ulna-pisiform, and olecrano-pisiform in *Cyclothurus*.

No special features require note in the other orders reviewed.

M. flexor carpi radialis (figs. 6, 7, 11, 12, 14, 15). This muscle arises from the entocondyle close to the entocondylar head of origin of the M. flexor carpi ulnaris.

It forms a broad fleshy belly on the flexor aspect of the forearm, which suddenly narrows a little above the wrist and forms a rounded tendon, which passes through a canal in the "scapho-carpal" (fig. 10, *for.f.c.r.*). In this bony canal the tendon divides

---

* iv., page 18. † xxix., page 163. ‡ xxxvi., page 131. § lxxii., page 230. ‖ liii., page 9. ¶ xxxix., page 388. ** lxii., page 23, and Taf. iv., fig. 12. †† iii., page 147. ‡‡ xxxvii., page 28. §§ xxvi., page 827.

into two. Entering the palm these are inserted one into the base of the metacarpal of the pollex, and the other into the base of the metacarpal of the index (fig. 15).

Considerable variety prevails among Marsupials with respect to the mode of insertion of this muscle. Thus in *Thylacinus** it is inserted partly into the trapezium and partly into the metacarpal of the pollex; in *Phascogale** into the trapezium alone; in Cuscus* the tendon splits, and the slips are inserted into the palmar aspects of the bases of the metacarpals of the index and medius respectively. In *Dasyurus*† its tendon occupies a special compartment in the outer part of the anterior annular ligament, and is inserted partly into the palmar aspect of the trapezium and partly into the bases of the second and third metacarpal bones. In *Chironectes*‡ it is inserted into the radial side of the base of the metacarpal of the medius only, and in *Phascolarctos*§ also the insertion is so limited. In *Phascolomys*, *Phalangista*, *Didelphys*, and *Perameles* the muscle passes from the entocondyle to the third metacarpal,|| but in *Sarcophilus*|| a slip in addition is attached to the trapezium. In *Myrmecobius*¶ it is attached to the carpus only (scaphoid trapezium and lig. carpi volare). It is inserted into the bases of the second and third metacarpals in *Petaurista.***

In *Ornithorhynchus* the muscle is relatively very large, and is deep palmo-dorsally; the pronator radii teres lies embedded in its ulno-palmar aspect. Its origin is from the entocondyle at its tip, but extending deeply on its distal aspect to the very edge of the humero-radial articulation. Part of the muscle arises from the neck of the radius.

Just above the carpus the broad fleshy belly narrows with great abruptness, and a single rounded tendon results which is wholly inserted into the radial sesamoid bone, and has no connection except by means of carpal ligaments with the metacarpal bones. This radial sesamoid is situated on the palmar aspect of the radio-carpal joint and scapho-lunar bone, and is united to the latter by ligament.

In *Echidna* the muscle is not relatively quite as large as in *Ornithorhynchus*, but it has substantially the same origin and relations in the forearm (I could not make certain that any of its fibres actually took origin from the radius in the specimen I examined for this purpose).

In the lower part of the forearm it does not contract in width so markedly as does the corresponding muscle in *Ornithorhynchus*, but a stout tendon (derived from the tendinous investment of the muscles) appears along its palmar border. The deeper part of the muscle is continued, partly fleshy and partly tendinous, into the carpus. Here it encounters the radial sesamoid bone into which it is inserted, and this bone is in turn connected by strong ligamentous fibres with the large scapho-lunar bone in front of which it is placed. The more superficial tendon of the palmar border of the muscle as it enters the hand flattens out and passes in front of the sesamoid. Westling says it is connected with the first and second metacarpals. I find, however, that such a connection is at most quite indirect through the palmar carpo-metacarpal ligaments with which the tendinous fibres are connected.

---

* iv., page 17. † xxxvi., page 130. ‡ liii., page 9. § lxxii., page 230. xxix., page 162. ¶ xxvi., page 822. ** xix., page 176.

The chief part of the tendon is really inserted into the trapezium and the scapho-lunar, distal to the radial sesamoid.

The descriptions just given differ somewhat from those given by other observers,* though on the whole I can corroborate the account given by Westling of the arrangement of the muscle in *Echidna*.

The radial sesamoid in *Ornithorhynchus* is very firmly attached to the palmar aspect of the scapho-lunar, but I could find no indication whatever of any special continuation of the tendon of the flexor carpi radialis to the base of the second metacarpal, such as is alleged to exist in Meckel's descriptions.†

In *Chlamydophorus*, *Cyclothurus*, and *Tatusia*‡ this muscle is small, and is inserted into the metacarpal of the pollex only; into third, second, and first metacarpals in *Pholidotus*;‡ into the index metacarpal, with the intervention of a radial sesamoid bone, in *Orycteropus*,§ and into the carpus only in *Dasypus* (os multangulum)|| and *Choloepus* (scaphoid and os multangulum).‡

In *Dasyprocta* (and in Hare, Rabbit, and Guineapig)¶ the muscle is entocondylar in origin, but is inserted into the base of the first phalanx of the index. But in rodents in general Meckel speaks of it as arranged as usual,** and Leche gives the index metacarpal as the insertion in the Rabbit.††

Amongst the *Insectivora* it arises in *Chrysochloris*, not only from the entocondyle, but from the proximal third of the ossified tendon of the flexor profundus digitorum. It is then inserted into the index metacarpal, as also in *Erinaceus*.‡‡

Amongst *Carnivora* the muscle is inserted usually into the index metacarpal, but may be also into the first or third, *e.g.*, dog.

As already stated, there is no *M. palmaris longus* present in Notoryctes, and the *M. flexor sublimis digitorum* being also absent, there is only one long digital flexor present forming the representative of the M. flexor profundus digitorum (+ flexor longus pollicis) of other forms.

M. flexor digitorum (figs. 12-15 *f.dig.*) consists of a muscular mass imperfectly segmented into four portions.

Following Windle's classification§§ of the constituents of the deep flexor mass, we may here distinguish representatives of (a) *condylo-ulnaris*, (b) *condylo-radialis*, (c) *ulnaris proprius*, (d) *radialis proprius*. I found no trace of a *centralis* element.

All the parts of the muscle are attached to the large palmar sesamoid bone (figs 13-15 *p.ses.*). See also Stirling's description.||||

From the distal portion of this bone the tendons of insertion proceed.

Condylo-ulnaris and *condylo-radialis* (*f.dig. 1 and 2* in figures) arise side by side from the slight pit-like depression on the distal

---

* xxxvii., page 27 ; iii., page 152 ; xxxix., page 388 ; and lxii., page 25.
† xxxvii., page 27, and xxxviii., page 543. ‡ xxvii., page 250. § xv., page 584. || xiv., page 544. ¶ xl., page 400. ** xxxvii., page 544. †† xxvi., page 821. ‡‡ xxvi.. page 822. §§ lxviii., page 73. |||| liv., page 177, and Pl. viii., fig. 5.

aspect of the entocondyle. They are partially distinct as far as the sesamoid bone, into which they are inserted, partly fleshy, partly tendinous, rather in front of the other two portions.

Ulnaris proprius (*f. dig.* 3 in figures) arises from the whole of the hollow inner surface of the large olecranon and from the inner surface of the proximal half of the ulnar shaft. It is partly overlapped by the condylar heads of the muscle, and largely by that of the flexor carpi ulnaris. It is inserted into the proximal end of the palmar sesamoid by a stout rounded tendon, side by side with, and on the ulnar side of, the insertions of the condylar heads, though slightly on a deeper plane. The tendon of insertion is continued up in the substance of the muscle; and into the superficial aspect of the tendon, in the upper part of the forearm, are inserted many short fleshy fibres, which arise from the intermuscular septum between the muscle and the overlying flexor carpi ulnaris.

The remaining portion—*radialis proprius* (*f. dig.* 4 in figures)—is deepest of all. It takes origin by fleshy fibres from the shaft of the radius, extending up as far as the insertion of the biceps, and downwards as far as the lower end of the radius. It is inserted into the deeper aspect of the proximal end of the palmar sesamoid, close to its radial corner.

The distal extremity of the palmar sesamoid gives origin to two short, very thick, and rounded tendons; and a third, more slender, tendon arises from the radial border of the bone, close to its distal end. The latter passes on to the palmar aspect of the second digit, and courses distally in front of its proximal phalanx, to whose palmar surface it is secured by a fibrous ring. It then passes on to be inserted into the palmar aspect of the base of the terminal phalanx.

The other two thicker tendons are inserted into the palmar aspects of the strong ungual phalanges of the third and fourth digits respectively.

A tendinous vinculum connects the medial with the indicial tendon (fig. 15, *vi.*).

Lumbrical slips are entirely absent.

Windle* has shown that where the flexor profundus attains a relatively great development, the flexor sublimis is proportionately reduced, and this he states to be the case in many of the *Carnivora*, and some of the *Marsupialia*.

Such a condition is typically illustrated in the case of *Dasyurus*, where flexor sublimis was found by MacCormick† to consist of a slender tendon lying in a shallow groove in front of the great flexor tendon, and arising from the front of the upper part of the latter. This author describes the great deep flexor mass in four parts, the first

* lxviii., page 73. † xxxvi., page 132.

of which he takes to be equivalent to the origin of the flexor sublimis; but this is independent of the muscle he describes, as above quoted, and is, in fact, plainly identical with Windle's condylar portions. MacCormick's fourth division of the deep flexor is evidently a typical *centralis* element.

Palmaris longus is well developed in *Dasyurus*. An essentially similar condition obtains in *Phascolarctos*,* *Chironectes*,† and *Myrmecobius*.‡

In Cuscus§ Cunningham found the flexor sublimis arising by four minute fleshy slips from the surface of the deep flexor mass, but he regarded as the real equivalent of the origin of the flexor sublimis what Windle has since taught us to regard as condylo-ulnaris and -radialis portions of the deep flexor. Practically the same arrangement was found in *Thylacinus* and *Phascogale*.§ So also in *Phascolomys* and *Sarcophilus*,‖ according to Macalister, who also accepts the condylar origin as a sublimis, inseparable from profundus, and explains the arrangement as practically a digastric condition of the sublimis.

I find no case recorded in the literature of marsupial myology in which the flexor sublimis or palmaris longus are entirely absent.

Westling¶ and Leche‡ both state (authority not given) that in *Macropus* (as in *Echidna*) no distinct flexor sublimis is present, but Macalister states‖ that in the Wallaby the sublimis "arises from the inner condyle inseparably united to the profundus; but from the tendon of the common flexor above the wrist the fleshy fibres of the sublimis arise and form a lower belly, which sends tendons to all the fingers but the first." Hence the condition in certain species of *Macropus*, at least, is similar to the ordinary marsupial one.

Flexor digitorum gives tendons to all five digits in marsupials generally. Flexor sublimis usually goes to the four ulnar digits, but in *Myrmecobius*‡ and *Chironectes*† the tendon for the fifth digit is lacking.

I find no record of the existence in any other marsupial of a palmar sesamoid, such as is found in *Notoryctes*. The nearest approach to such a condition is recorded by MacCormick in *Dasyurus*. In that animal there is just above the wrist "an exceedingly strong tendinous mass, which, on its deep surface, is covered by a pad of fibro-cartilage, . . ."**

In *Echidna* there is a single large flexor mass, a small partially separable superficial portion of which Mivart surmised might represent the palmaris longus. He also took the condylar part of the mass to represent the flexor sublimis element.†† Westling‡‡ does not refer to any subdivision of the mass.

At the wrist an exceedingly strong tendon is developed, and in this is a sesamoid bone (one or two, Mivart). Below this the tendon splits into five tendons inserted into the terminal phalanges by each of the digits.

In *Ornithorhynchus*, too, there is only one flexor mass in the forearm, with a similar arrangement as regards the digits. Coues found

---

* lxxii., page 231. † liii., page 9. ‡ xxvi., page 823. § iv., page 18. ‖ xxix., page 163. ¶ lxii., page 24. ** xxxvi., page 132. †† xxxix., page 388. ‡‡ lxii., page 23.

"several small irregular gritty specks like imperfect sesamoids" in the tendon at the wrist* (*cf.* also Meckel†).

In this animal, however, Coues found a small fusiform belly embedded in the substance of the muscle, and ending in a fine tendon, which was traced distinctly to the wrist, and then lost.‡ This he took to be palmaris longus. He also found in the palm a small muscle, or rather four small muscles, arising from the palmar aspect of the tendon of the deep flexor. The fine tendons of these slips he found partly to join those of the deep flexor, and partly to be arranged like those of a flexor sublimis, to which accordingly he homologises it.

Meckel refers to the last, but does not name it; and he states that the four small tendons are inserted, not into bone, but into the interdigital membrane.§ I think Coues' view of the homology is probably correct, and if so the condition in *Ornithorhynchus* falls well in line with that described, *e.g.*, in Cuscus, by Cunningham (*supra* p. 172), where the flexor sublimis was reduced to four small fleshy slips arising in the forearm from the surface of the deep flexor mass. There is, however, another possible view of the palmar fleshy slips in *Ornithorhynchus*, viz., that they represent a palmaris longus. The superficial position of the slips, and the somewhat indefinite ending of their tendons in sheathing the digital flexor tendons is at least equally explicable upon such an hypothesis. There is certainly no other representative of the palmaris longus present.

I have traced the small fusiform muscle which Coues found embedded in the flexor mass in *Ornithorhynchus*. Its fine tendon, surrounded by the musculo-tendinous fibres of the rest of the muscle, is attached to one of the sesamoid bones in the common tendon. It undoubtedly corresponds, not to the palmaris longus, as Coues thought, but to the "centralis" flexor element of Windle.‖ It is indeed a fairly typical example of this factor of the flexor mass.

Both in *Echidna* and *Ornithorhynchus* the great flexor muscle is ulnar and entocondylar in origin.

In *Chlamydophorus* there is a palmar sesamoid ossicle, and to it three muscles are attached, according to Macalister.¶ The first he regards as flexor sublimis, and is the only condylar part of the flexor mass. It as attached to the ulnar side of the palmar sesamoid. I should think it highly probable that this in reality is only the condylar portion of the deep flexor, or at least of an only partially differentiated flexor mass. There are, at any rate, no insertion slips which correspond to those of a flexor sublimis. The other sectors of the flexor mass attached to the palmar ossicle are an ulnaris (Macalister's flexor profundus) and a radialis (flexor longus pollicis). The three sectors seem to be quite separable in the forearm. From the distal end of the ovate ossicle five tendons proceed, including an exceedingly fine one to the pollex.

But Macalister describes in addition** seven fine fleshy bundles arising from the sesamoid bone, which are inserted *into each side of the second phalanges* of the fingers except the thumb, and the ulnar side of the minimus, "forming short flexors." These slips at once remind one of the very similar slips in *Ornithorhynchus*, and, as in that animal,

* iii., page 154. † xxxvii., page 28. ‡ iii., page 155. § xxxvii., page 28, and xxxviii., page 559. ‖ lxviii., page 74. ¶ xxvii., page 251. ** xxvii., page 252.

are at least highly suggestive of true flexor sublimis elements, here again shrunk down into the palm. Such a reduction, complete or partial, is, in fact, found in other well-known forms, as in *Hatteria*;* and amongst the Mammalia in *Viverra civetta*,† where that part of the flexor sublimis, at least, which is inserted into the fifth digit, arises not with the rest of the superficial flexor fibres in the forearm, but from the annular ligt. and pisiform. The tendon to the fourth digit, too, in this animal receives an accessory short slip which joins the proper flexor perforatus tendon. Finally, in the *Jerboa*,‡ according to Humphry, "the flexor sublimis passes to the three middle digits only, the other digits (I. and V.) receiving delicate muscular superficial flexors from the supernumerary carpal ossicle which is present in that animal."

Further, in *Chlamydophorus* there is a large, thin superficial palmaris longus§ condylar in origin and fleshy to the wrist nearly. "Its tendon expands over the palmar ossicle, and ends in four superficial slips lost in sheathing the tendons over the digits." Hyrtl was doubtful whether the latter insertion was not that of a flexor sublimis. Macalister's rejection of this tentative view is doubtless right, but I am inclined to believe that his "sublimis" is only part of the deep flexor mass, and that the true sublimis is represented by the small fleshy slips referred to arising from the palmar sesamoid.

In *Myrmecophaga jubata*|| Macalister says that the flexor sublimis is unrepresented, but that a strong bicipital palmaris longus is present inserted by two slips, one on each side of the first phalanx of the powerful middle digit. The flexor profundus is very large, with five heads, but forming a single fleshy belly ending in three tendons—one central, enormous, for the third digit; one smaller, to the fourth toe; one still smaller to the index, and a very fine slip to the pollex

The same author notes the presence in *Myrmecophaga* of "a small superficial flexor of the fifth digit, arising from the annular ligament on its inner side by a tendon; this small muscle gives off a slip to the ulnar side of the lumbricalis for the medius."¶

In the absence of a flexor sublimis this muscle bears an interesting resemblance to similar slips in the *Civet* and *Jerboa* for the fifth digit (v. supra). No such arrangement was found in any of the other insectivorous Edentates examined by Macalister.

The arrangements of the flexor mass vary so considerably amongst Edentates that it is scarcely possible to give a synopsis of them. There is, however, a general tendency to imperfection in the segmentation of flexor sublimis, from the palmaris longus on the one hand, and from the flexor profundus stratum on the other; and in several cases flexor sublimis is entirely absent. The arrangement of the tendons of the deep flexor varies, of course, with the skeletal modifications of the manus. It is interesting to note the presence or absence of the palmar sesamoid which in several Edentate forms assumes large proportions, as in *Notoryctes*. It is present in *Manis*, but is absent in the other ant-eaters, and in *Orycteropus* Macalister remarks that "its presence in *Manis* is interesting, as it is characteristic of all the cataphractous edentates."¶

---

* xx., page 176. † xxii., page 172. ‡ xx., page 176, Note. § xxvii., page 250. || xxxv., page 502. ¶ xxxv., page 503.

In *Talpa** the flexor mass forms one single unsegmented muscle, from which comes a strong tendon; but in *Erinaceus** all the factors are present. In *Chrysochloris*† the flexor sublimis is very small, and passes only to the second finger. In the latter form the flexor profundus has a large ossification in it which reaches to the carpus.

The sublimis and profundus are generally well differentiated in this order.

Among the *Rodentia* Windle‡ notes that the flexor sublimis is nearly always a somewhat deeply placed muscle owing to its being overlapped by the large palmaris longus and flexor carpi ulnaris. According to the same author, the sublimis is reduced to a minimum in the *Carnivora*, existing nearly always merely as "an offshoot from the condylo-ulnaris near the lower end of the forearm." In this respect the *Carnivora* would seem to resemble the *Marsupialia*.

It would appear from Mivart's and Murie's account of the anatomy of *Dasyprocta*§ that a flexor brevis manûs exists as a small superficial muscular mass superficial to the flexor tendons, and arising from their surface, in addition to a long flexor sublimis. It had an apparent attachment or insertion into the proximal end of the fifth digit. In the right limb the long flexor sublimis gave tendons to the second, third, and fourth digits; on the left side to the fifth as well. It is probable that this flexor brevis manûs is simply a short accessory portion of the flexor sublimis corresponding closely to that found in the Civet (v. supra, p. 61). The condition in the Guinea-pig would also seem to be similar, according to Humphry,‖ though Mivart and Murie state that they failed to detect a corresponding structure in that animal.

Intrinsic Musculature of the Manus.

Three muscles only are present, viz.:—

M. abductor pollicis,

M. flexor brevis pollicis, and

M. flexor brevis indicis.

M. abductor pollicis (*brevis*) (figs. 6, 7, 10, 12, 13, 14, and 15, *ab.p.*). This muscle is contained in the prominent fold of naked skin which corresponds to the ball of the thumb, and which near its proximal part or base is in close relation to the projection of the rudimentary fifth digit.¶

It is a small but fairly thick quadrate muscle which arises from the aponeurosis of the manus near the wrist at a point corresponding to the anterior annular ligament (which is not very specially developed). It is inserted into the (morphologically) preaxial or radial manubrium** which juts out from the proximal phalanx of the pollex.

M. flexor brevis pollicis (figs. 13 and 14, *f.b.p.*) consists of two small flattened muscular bands arising together from the base of the metacarpal of the third digit. They are inserted into oppo-

---

* lxviii,, page 76. † xxvi., page 824. ‡ lxviii., page 77. § xl., page 402. ‖ xx., page 176, Note. ¶ Figs. 2, 9, 12, 13, 14, 15, and 17 "V." ** Fig. 15, "*p. 1.*"

site sides of the proximal phalanx of the pollex, the radial insertion being in close relation to the insertion of the abductor.

Along with this may be described the *M. flexor brevis indicis*, represented by one small fleshy belly taking origin from the palmar aspect of the third metacarpal and inserted into the palmar aspect or perhaps the ulnar border of the base of the proximal phalanx of the index.

I know of no other instance amongst the Marsupials where modification by suppression of the intrinsic musculature of the hand has gone on to such an extent as in *Notoryctes*. And with regard to Marsupials generally, Young has remarked* that in no other class of mammals has the common mammalian "type" of this musculature been so constantly adhered to as in the *Marsupialia*. The case of *Notoryctes* is therefore the more noteworthy. There can be little doubt that the extreme degree of structural modification here exhibited is simply the result of a very marked specialisation from functional requirements. A study of the skeleton of the hand will amply confirm this conclusion.† Further, be it noted, that the structural modification of this group of muscles is wholly in the way of suppression, and that in so far as intrinsic muscles are present their homologies are quite easily interpreted. There is no representative whatever of the palmar layer of "*adductores*" The only representative of the dorsal layer of "*abductores*" is the abductor-pollicis; while the intermediate layer of "*flexores*" is represented by three bellies, viz., both bellies of the flexor brevis pollicis and the ulnar belly of the flexor brevis indicis.

In view of the anomalous reduction in the musculature of the region under notice, it is unnecessary to institute any systematic comparison with other forms, and it will suffice to take note of the condition as regards the muscles of the hand in a few animals in which we might expect similar, or at least parallel, modifications.

As already stated, the condition in *Notoryctes* is quite unique amongst marsupials. And although the *Echidna* is a powerful digger and burrower, a glance at its skeleton is sufficient to discourage one from expecting any very marked myological resemblance to the hand of *Notoryctes*. It is, however, the case that in *Echidna* we have an instance of considerable reduction from the type. The muscles present (apart from the lumbricals), with one exception, belong to the dorsal layer of abductores. These latter are—Abductor pollicis (Flexor brevis pollicis of Fewkes‡), and five interosseous muscles. The remaining muscle is reckoned by Mivart§ as a sixth interosseous, but Westling takes it to be equivalent both to a flexor brevis and an opponens pollicis.‡ It arises from the tendon of the flexor carpi radialis, and is inserted, according to Westling, into the proximal phalanx and metacarpal of the pollex on its radial aspect.

In *Chlamydophorus*|| Macalister found a slender cylindrical abductor pollicis, an opponens pollicis, and a muscle which he regarded as conjoint flexor brevis and abductor pollicis. He further states that these polliceal muscles are absent in *Cyclothurus*, *Bradypus*, and *Cholœpus*,||

---

* xxxv., pages 158-9. † liv., Pl. viii. ‡ lxii., page 28. § xxxix., page 389. || xxvii., page 253.

though elsewhere* he describes a superficial polliceal muscle in *Cyclothurus* inserted into the rudimentary trapezium and preaxial side of the manus.

In his "Report on the Insectivorous Edentates," the same author states that "the short muscles of the hand are very well developed."*

The only indication of the condition in *Chrysochloris* which I can find is in the following statement from Leche:—"Während bei *Myogale* noch besagte Flexores br. und Adductor pollicis die Handmusculatur bilden, fehlt eine solche bei *Chrysochloridæ* und *Talpina* gänzlich."†

REFERENCES TO LITERATURE.

I. Brooks, H. St. John, "On the Morphology of the Extensor Muscles." Studies from the Museum of Zoology in Univ. Coll., Dundee, No. V. (Dundee, 1889).

II. Brooks, H. St. John, "Morphology of the Muscles on the Extensor Aspect of the Middle and Distal Segments of the Limbs." Proc. Anat. Soc., Gt. Brit. and Irel. 1888, pp. xv. and xix.

III. Coues, E., "On the Myology of the *Ornithorhynchus*." Communications, Essex Institute, vol. VI., March, 1871.

IV. Cunningham, D. J., "Marsupialia." Challenger Reports, vol. V., part XVI.

V. Cunningham, D. J., (On "Achselbogen," in the report of the Committee of Investigation in Anatomy in Trinity Coll., Dublin.) Trans. Roy. Acad. Med., Irel., vol. VII., 1889, p. 383.

VI. Cuvier and Laurillard, "Anatomie Comparée, Recueil de Planches de Myologie." Paris, 1855.

VII. Devis, C. W., "Note on the Myology of *Viverra civetta*." Journ. Anat. and Physiol., vol. II., p. 207.

VIII. Dobson, G. E., "Anatomy of the Erinaceidae." Proc. Zool. Soc., 1881, p. 389.

IX. Ellenberger and Baum, "Anatomie des Hundes." Berlin, 1891.

X. Flower, W. H., and Gadow, H., "Osteology of the Mammalia." London, 1885.

XI. Freeman, R. A., "Anatomy of the Shoulder and Upper Arm of the Mole." Journ. Anat. and Physiol., vol. XX., p. 201.

XII. Fuerbringer, M., "Zur vergleich. Anat. der Schultermuskeln." Jenaische Zeitschrift, Bde. VII. and VIII.

---

* xxxv., page 503. † xxvi., page 835.

XIII. Fuerbringer, M., "Zur vergleichenden Anatomie der Schulter-muskeln." Morphologisches Jahrbuch, Bd. I. (Leip., 1876).

XIV. Galton, J. C., "The Muscles of the Fore and Hind Limbs in *Dasypus sexcinctus*." Trans. Linn. Soc., vol. XXVI., p. 525.

XV. Galton, J. C., "The Myology of the Upper and Lower Extremities of *Orycteropus capensis*." Trans. Linn. Soc., XXVI., p. 567.

XVI. Galton, J. C., "Myology of *Cyclothurus didactylus*." Ann. Mag. Nat. Hist., 4th ser., vol. IV., 1869, p. 244.

XVII, Galton, J. C., "Note on the Epitrochleo-anconeus," &c. Journ. of Anat. and Physiol., vol. IX., p. 169.

XVIII. Giebel, C. G., On Mammalian Osteology, in Bronn's "Klassen und Ordnungen des Thierreichs." Bd. VI., Abt. V.

XIX. Haswell, W. A., "Notes on the Myology of the Flying Phalanger (*Petaurista taguanoides*)." Proc. Linn. Soc., N.S.W., ser. II., vol. I.

XX. Humphry, G. M., "Observations in Myology." Cambridge and London, 1872.

XXI. Humphry, G. M., "Myology of *Orycteropus capensis*," &c. Journ. Anat. and Physiol., vol. II., 295.

XXII. Humphry, G. M., "Myology of the Limbs of the Unau, the Aï, the Two-toed Ant-eater, and the Pangolin." Journ. Anat. and Physiol., vol. IV., p. 17.

XXIII. Humphry, G. M., "On the Disposition and Homologies of the Extensor and Flexor Muscles of the Leg and Forearm." Journ. Anat. and Physiol., vol. III., p. 320.

XXIV. Hyrtl, Jos., "*Chlamydophori truncati* cum *Dasypodi*," &c. Denkschriften der K. Akad. d. Wiss. Wien Math.-Naturwiss. Classe, 1855, p. 1.

XXV. Haughton, S., "Myology of the Crocodile." Ann. Mag. Nat. Hist., ser. IV., No. 4, April, 1868.

XXVI. Leche, W., (On Mammalian Myology) in Bronn's "Klassen und Ordnungen des Thierreichs," VI. Band, Abt. V., Lief 29-41 (so far as appeared).

XXVII. Macalister, A., "Anatomy of *Chlamydophorus truncatus*, with Notes on other Species of Edentata." Trans. Roy. Irish Acad., vol. XXV., p. 219.

XXVIII. Macalister, A., "On the Muscular Anatomy of the Koala," Annals and Mag. Nat. Hist., vol. X. (1872), p. 127.

XXIX. Macalister, A., "Myology of Wombat and Tasmanian Devil." Annals and Mag. Nat. Hist., vol. V. (1870), p. 153.

XXX. Macalister, A., "Further Observations on the Myology of *Sarcophilus ursinus*." Ann. & Mag. Nat. Hist., vol. X. (1872), p. 17.

XXXI. Macalister, A., "On the Homologies of the Flexor Muscles of the Vertebrate Limb." Journ. Anat. and Physiol., vol. II., p. 283.

XXXII. Macalister, A., "On the Myology of *Bradypus tridactylus*." Ann. Mag. Nat. Hist., ser. IV., vol. IV. (1869).

XXXIII. Macalister, A., "On the Arrangement of the Pronator Muscles in the Limbs of Vertebrate Animals." Jour. Anat. & Phys., vol. III., p. 335.

XXXIV. Macalister, A., "Catalogue of the Principal Muscular Variations," &c. Trans. Roy. Irish Acad., vol. XXV., p. 1.

XXXV. Macalister, A., "Report on the Anatomy of the Insectivorous Edentates." Trans. Roy. Irish Acad., XXV., 491.

XXXVI. MacCormick, Alex., "The Myology of the Limbs of *Dasyurus viverrinus*." Journ. Anat. & Physiol., vol. XXI., p. 103.

XXXVII. Meckel, J. F., "*Ornithorhynchi paradoxi* descriptio anatomica" (Lips., 1826).

XXXVIII. Meckel, J. F., "System der Vergleichenden Anatomie," 3TER Theil (Halle, 1828).

XXXIX. Mivart, St. George, "Anatomy of *Echidna hystrix*." Trans. Linnean Soc., vol. XXV., p. 379.

XL. Mivart & Murie, "Anatomy of the Crested Agouti." Proc. Zool. Soc., 1866, p. 383.

XLI. Mivart, St. G., "Anatomy of *Erethizon dorsatus*." Proc. Zool. Soc., 1882, p. 271.

XLII. Mivart, St. G., "Myology of *Iguana tuberculata*." Proc. Zool. Soc., 1867, p. 766.

XLIII. Mivart, St. G., "Myology of *Menopoma* and *Menobranchus*." Proc. Zool. Soc., 1869, pp. 254 and 450.

XLV. Owen, R., "Anatomy of Vertebrates." London, 1868, vol. III.

XLVI. Owen, R., article "Monotremata," Todd's Cyclopædia of Anat. and Physiol. London, vol. III.

XLVII. Parker, W. K., "Monograph on the Structure and Development of the Shoulder-girdle, and Sternum." Ray Soc. Memoir, 1868.

XLVIII. Parsons, F. G., "Notes on the Myology of Rodents." Proc. Anat. Soc. Gt. Brit. & Irel., 1892, p. X.

XLIX. Paterson, A. M., "The Limb Plexuses of Mammals." Journ. Anat. & Physiol., vol. XXI., p. 611.

L. Perrin, J. B., "On the Myology of the Limbs of the Kinkajou (*Cercoleptes caudivolvulus*)," P.Z.S., 1871, p. 547.

LI. Rolleston, G., "On the Homologies of Certain Muscles connected with the Shoulder Joint." Trans. Linn. Soc., vol. XXVI., p. 609.

LII. Shepherd, F. J., "Short Notes on the Myology of the American Black Bear (*Ursus Americanus*)." Journ. Anat. & Physiol., vol. XVIII., p. 101.

LIII. Sidebotham, E. T., "Myology of the Water-Opossum (*Chironectes variegatus*)." P.Z.S., 1885, pp. 6-22.

LIV. Stirling, E. C., "Description of New Genus and Species of Marsupialia '*Notoryctes typhlops.*'" Trans. Roy. Soc. S. Australia (1891), p. 154.

LV. Stirling, E. C., "Further Notes on the Habits and Anatomy of '*Notoryctes typhlops.*'" Trans. Roy. Soc. S. Australia, 1891, p. 283.

LVI. Testut, L., "Les Anomalies Musculaires," &c. Paris (1884).

LVII. Watson & Young, "Anatomy of *Hyæna crocuta.*" Proc. Zool. Soc. (1879), p. 79.

LVIII. Wenzel Gruber, "Ueber den Musculus Anconeus V. des Menschen," in Memoires de l'Acad. Imp. des Sciences de St. Petersbourg, T. XVI., No. 1 (1870).

LIX. Wenzel Gruber, "Ueber den M. Epitrochleo-anconeus, &c." Memoires de l'Acad. Imp. des Sciences de St. Petersbourg, T. 10, No. 5, 1866.

LX. Wenzel Gruber, "Monographie über den M. ulnaris digiti V. und, &c." Beobactungen aus der menschl. u. vergleich. Anat., V Heft. Berlin, 1884.

LXI. Wenzel Gruber, "Monographie über den Musculus extensor digiti indicis proprius, &c." Beobachtungen aus der menschl. und vergleich. Anat., VI Heft. Berlin, 1886.

LXII. Westling, C., "Anatomische Untersuchungen über Echidna." Bihang till Kongl. svenska Vetenskaps Akademiens Handlingar. Femtonde Bandet Afd. IV. Stockholm, 1890.

LXIII. Wilder & Gage, "Anatomical Technology." New York and Chicago, 1886.

LXIV. Wilson, J. T., & McKay, W. J. S., "On Some Points in the Anatomy of the Monotreme Scapula." Proc. Linn Soc. N.S.W., part 3, vol. VIII. 2nd Series.

LXV. Windle, B. C. A., "Myology of *Erethizon epixanthus.*" Journ. Anat. and Physiol., vol. XXII., p. 126.

LXVI. Windle, B. C. A., "Limb Myology of *Procyon cancrivorus* and of the Ursidæ." Journ. Anat. and Physiol., vol. XXIII., p. 81.

LXVII. Windle, B. C. A., "The Pectoral Group of Muscles." Trans. Roy. Irish Acad., vol. XXIX., pt. xii., p. 345

LXVIII. Windle, B. C. A., "The Flexors of the Digits of the Hand." Journ. Anat. and Physiol., vol. XXIV., p. 72.

LXIX. Wood, J., "Variations in Human Myology," &c. Proc. Roy. Soc. Lond., vol. XVI. (1868).

LXX. Wood, J., "On Some Varieties in Human Myology." Proc. Roy. Soc. Lond., vol. XIII. (1864).

LXXI. Wood, J., "On Human Muscular Variations, and their Relation to Comparative Anatomy." Journ. of Anat. and Physiol., vol. I., p. 44.

LXXII. Young, A. H., "Muscular Anatomy of the Koala." Journ. Anat. and Physiol., vol. XVI., p. 217.

LXXIII. Young, A. H., and Robinson, A., "Anatomy of *Hyæna striata*." Journ. Anat. and Physiol., vol. XXIII., p. 187.

LXXIV. Young, A. H., "Myology of *Viverra civetta*." Journ. Anat. and Physiol., vol. XIV., p. 166.

LXXV. Young, A. H., "The Intrinsic Muscles of the Marsupial Hand." Journ. of Anat. and Physiol., vol. XIV., p. 149.

LXXVI. McKay, W. J. S. Forthcoming paper in Proc. Linn. Soc. N.S.W.

NOTORYCTES TYPHLOPS MYOLOGY.

EXPLANATION OF PLATES.

Plate II.

Fig. 1.—*Dorsal aspect, superficial.* x 2.

References.

r.a. M. cervico-auricularis.
c.t. " cleido-trapezius ("clavo-cucullaris").
d.t. " delto-trapezius ("trapezio-deltoid," "cephalo-humeral").
a.t. " acromio-trapezius.
s.t. " spino-trapezius.
rh. " rhomboideus.
l.d. " latissimus dorsi.
p.c. " panniculus carnosus (humeral portion).
tr. " triceps extensor antebrachii.
te. " temporalis.
s.d. " spino-deltoideus.
Au. External auditory meatus.
Pa. Parietal region of skull.
F. Muscles of forearm.

Plate III.

Fig. 2.—*View of right side of body, panniculus removed.* x 2.

s.m. M. sterno-mastoideus.
s.th. " sterno-thyroideus and sterno-hyoideus.
m.h. " mylo-hyoideus.
zy. " zygomaticus.
ma. " masseter.
te. " temporalis.
a.a. " attrahens aurem.
s.d. " spino-deltoideus ("acromio-deltoid," "scapular deltoid")
P.d. Parotid duct passing forwards to mouth.
S.g. Submaxillary gland and duct.
B.g. "Buccal" or "zygomatic" salivary gland.
Au. External auditory meatus.
O. Incision through abdominal walls.
Ol. Olecranon.
V. Nail of fifth digit.
L. Left manus.

(Other references as in Fig. 1.)

Plate IV.

Fig. 3.—*Ventral aspect.* x 2.

c.t. M. cleido-trapezius.
s.m. " sterno-mastoideus.
s.d.t. " spino-deltoideus, together with the conjoint delto-trapezius.
c.d. " cleido-deltoideus ("clavicular deltoid")
p.a. " pectoralis *a.*
p.b. " " *b.*
p.c. " " *c.*
s.th. " sterno-thyroideus.
s.h. " sterno-hyoideus.
m.h. " mylo-hyoideus.
o.h. " omo-hyoideus.
zy. " zygomaticus.
ma. " masseter.
a.a. " attrahens aurem.
s. " subclavius.
f.d. " flexor digitorum.
r.th. " rectus abdominis.
d. " digastricus.
P.g. Parotid gland.
B.g. "Buccal," or "zygomatic" salivary gland.
Au. External auditory meatus.
S.d. Duct of submaxillary gland.

Plate V.

Fig. 4.—*Deeper dorsal muscles of shoulder and neck.* x 2.

rh. M. rhomboideus.
r.a. " cervico-auricularis (with attachment to meatus).
te. " temporalis (covered by aponeurosis).
zy. " zygomaticus.
c.d.t. Cut edge of cleido- and delto-trapezius.
c.d.t.1. The same muscle turned aside.

a.t. M. acromio-trapezius.
s.t. " spino-trapezius, reflected.
s.d. " spino-deltoideus.
tr. " triceps extensor antebrachii.
Ac. Acromion process.
Mss. Root of meso-scapular spine.
S.d.1. Part of origin of spino-deltoid.

Fig. 5.—*Muscles of right side of head, neck, and shoulder.* x 2.

zy. M. zygomaticus.
te. " temporalis.
d.t. " delto-trapezius.
c.d.t. " cleido-trapezius, *with* M. delto-trapezius, conjoint.
c.t. " cleido-trapezius.
a.t. " acromio-trapezius.
s.t. " spino-trapezius.
tr. " triceps extensor antebrachii.
s.d. " spino-deltoideus.
s.m. " sterno-mastoideus.
r.a. " cervico-auricularis.
a.a. " mandibulo-auricularis (attrahens aurem).
m. " masseter.
m.h. " mylo-hyoideus.
B.g. Buccal gland.
Ol. Olecranon process.

Plate VI.

Fig. 6.—*Right anterior extremity. Muscles of axillary region and inner aspects of scapula and arm, and of palmar surface of forearm* (clavicle turned outwards out of sight). x 4.

r.abd. M. rectus abdominis.
s.c. " subclavius. Its insertion has been exposed by turning outwards the clavicle with the clavicular deltoid as well as the delto-trapezius.
s.b.s. " subscapularis.
t.m. " teres major.
s.mg. " serratus magnus (anterior major portion).
s.tr. Scapular head of triceps.
i.h.tr. Inner humeral head of triceps.
l.d. M. latissimus dorsi.
l.d.t. Its tendon or aponeurosis where it spreads out over flexor carpi ulnaris.
an.i. M. anconeus internus (epitrochleo-anconeus).
f.c.u. " flexor carpi ulnaris (condylar and olecranon heads).
ab.p. " abductor pollicis. Its origin overlies the palmar sesamoid bone, but is not attached to it, arising merely from the palmar fascia.
d.t. " delto-trapezius (pulled aside).
h.p. Humeral panniculus fibres becoming inserted into axillary tendon of insertion.
p.a. M. pectoralis *a* } Cut; *a* and *b* turned somewhat outwards,
p.b. " " *b* } and *c* turned upwards to show tendon
p.c. " " *c* } of panniculus, biceps, &c.
f.b.c. " biceps flexor antebrachii.
b.a. " brachialis anticus.
e.c.r. " extensor carpi radialis.

p.r.t. M. pronator radii teres.
f.c.r. " flexor carpi radialis
U.t. Ulnar (postaxial) tuberosity.
C.I. First costal arch, giving origin to M. subclavius and insertion to M. rectus abdominis.
sty. Radial styloid.
I., II., III., IV. Nails of respective digits.

Plate VII.

Fig. 7.—*Right anterior extremity. Muscles of inner aspects of scapula and arm and of palmar surface of forearm (clavicle turned outwards).* x 4.

s.c. M. subclavius (turned upwards).
rh. " rhomboideus.
s.mg. " serratus magnus.
o.h. " omo-hyoideus.
sbs. " subscapularis.
t.m. " teres major.
c.d. " cleido-deltoideus, turned aside with clavicle.
p.a. " pectoralis *a*
p.b. " " *b* } Cut, and *a* and *b* turned outwards.
p.c. " " *c*
ach. Section of axillary tendon connected with humeral panniculus.
l.d. M. latissimus dorsi.
s.tr. Scapular head of triceps.
i.h.tr. Inner humeral head of triceps.
f.b.c. M. biceps flexor antebrachii.
an.i. " anconeus internus (epitrochleo-anconeus).
f.c.u. " flexor carpi ulnaris (two heads).
f.c.r. " flexor carpi radialis.
p.r.t. " pronator radii teres.
e.c.r. " extensor carpi radialis.
ab.p. " abductor pollicis (freed of its origin).
C.C.l. Coraco-clavicular ligament.
R.t. Radial tuberosity of humerus (preaxial).
U.t. Ulnar tuberosity of humerus (postaxial).
Co. Coracoid process.
int.ep. Ulnar or postaxial epicondyle (ento-condyle).
Ol. Olecranon.
sty. Radial styloid.
p.ses. Palmar sesamoid bone.

Plate VIII.

Fig. 8.—*Right anterior extremity. View of deeper dorsal muscles of scapula and humerus.* x 4.

m.s.s. Meso-scapular spine.
p.s.s. Post-scapular spine.
m.seg. Meso-scapular segment.
p.s.m.ligt. Postscapulo-metacromial ligament.
cl. Clavicle.
d.p.tub. Deltopectoral tuberosity.
ol. Olecranon process.
s.s. M. supraspinatus.
s.c. " subclavius.
i.s. " infraspinatus.
b.a. " brachialis anticus.
s.tr. " triceps (scapular head).

s.tr.1. Surface of origin of scapular triceps.
o.tr. M. triceps (outer humeral head).
an.e. " anconeus externus (anconeus quartus),
ext. Extensor muscular mass of antebrachium.

Plate IX.

Fig. 9.—*Right anterior extremity. Dorsal aspect of forearm and manus, viewed slightly from the ulnar side.* x 4.

s.tr. Scapular head of triceps.
l.d. M. latissimus dorsi.
an.e. " anconeus externus.
e.c.u. " extensor carpi ulnaris.
e.c.d. 1, 2. " " communis digitorum (first and second parts).
e.c.r. " " carpi radialis.
e.i.m. " " indicis et medii digiti.
e.m.p. " " ossis metacarpi pollicis (abductor poll. longus).
f.c.u. " flexor carpi ulnaris.
d.c.lig. Dorsal carpal (posterior annular) ligament.
rad.sty. Styloid process of radius.
ect. Ectocondyle.
Ol. Olecranon.
III., IV., V. Claws of 3rd, 4th, and 5th digits respectively.

Plate X.

Fig. 10.—*Right anterior extremity. Muscles of palmar aspect of forearm.* x 4.

pect. Pectoral muscles.
f.b.c. M. biceps flexor antebrachii.
b.a. " brachialis anticus.
p.r.t. " pronator radii teres.
e.c.r. " extensor carpi radialis.
flex.dig. " flexor digitorum.
abd.poll. " abductor pollicis (brevis).
e.m.p. " extensor ossis metacarpi pollicis (abductor pollicis longus).
e.i.m. " extensor indicis et medii digiti.
p.ses. Palmar sesamoid bone.
rad.sty. Styloid process of radius.
for.f.c.r. Foramen in scapholunar for tendon of M. flexor carpi radialis.
I., II., III. Claws of 1st, 2nd, and 3rd digits respectively.

Plate XI.

Fig. 11.—*Right anterior extremity. View of radial aspect of forearm and manus.* x 4.

e.c.r. M. extensor carpi radialis.
p.r.t. " pronator radii teres.
f.c.r. " flexor carpi radialis.
e.m.p. " extensor ossis metacarpi pollicis (abductor poll. longus).
e.i.m. " extensor indicis et medii digiti.
e.c.d.1. " extensor communis digitorum (tendon for digit 3).
rad.sty. Styloid process of radius.
p.ann.lig. Dorsal carpal (posterior annular) ligament.
p.1. Proximal phalanx of pollex.
I., II., III. Claws of 1st, 2nd, and 3rd digits.

Plate XII.

Fig. 12.—*Right anterior extremity. View of palmar aspect of wrist, with morphologically dorsal aspect of pollex and index.* x 4.

p.r.t. M. pronator radii teres.
f.c.r. " flexor carpi radialis.
f.dig. " flexor digitorum.
f.c.u. " flexor carpi ulnaris
e.c.r. " extensor carpi radialis.
e.m.p. " extensor ossis metacarpi (abd. longus) pollicis.
ab.p. " abductor (brevis) pollicis.
e.i.m. " extensor indicis et medii digiti.
N.med. Nervus medianus.
p.1. Proximal phalanx of pollex.
I., II., III. Claws of 1st, 2nd, and 3rd digits respectively.
V. Apex of pisiform where it meets apex of 5th digit.

Fig. 13.—*Right anterior extremity. View of palmar aspect of manus (pollex and index forcibly abducted and permanent opposition reduced).* x 4.

f.c.u. M. flexor carpi ulnaris.
f.dig. 1, 2, 3 } " flexor communis digitorum
ab.p. " abductor pollicis.
f.b.p. " flexor brevis pollicis.
f.c.r. " flexor carpi radialis.
I.–V. Claws of respective digits.
p.1. Proximal phalanx of pollex.
p.ses. Palmar sesamoid bone.
pi. Pisiform bone.

Plate XIII.

Fig. 14.—*Right anterior extremity. Palmar aspect of manus* (attitude as in Fig. 13). x 6.

rad.sty. Styloid process of radius.
i.t., *m.t.*, *a.t.* Tendons of flexor communis digitorum to index, medius, and annularis respectively.
f.b.p. M. flexor brevis pollicis.
*m.*I., *m.*II. First and second metacarpal bones.
s.c. Scaphocarpal.
tr. Trapezium.

(Other letters as in Fig. 13.)

Plate XIV.

Fig. 15.—*Right anterior extremity. Deep dissection of palmar aspect of forearm.* x 4.

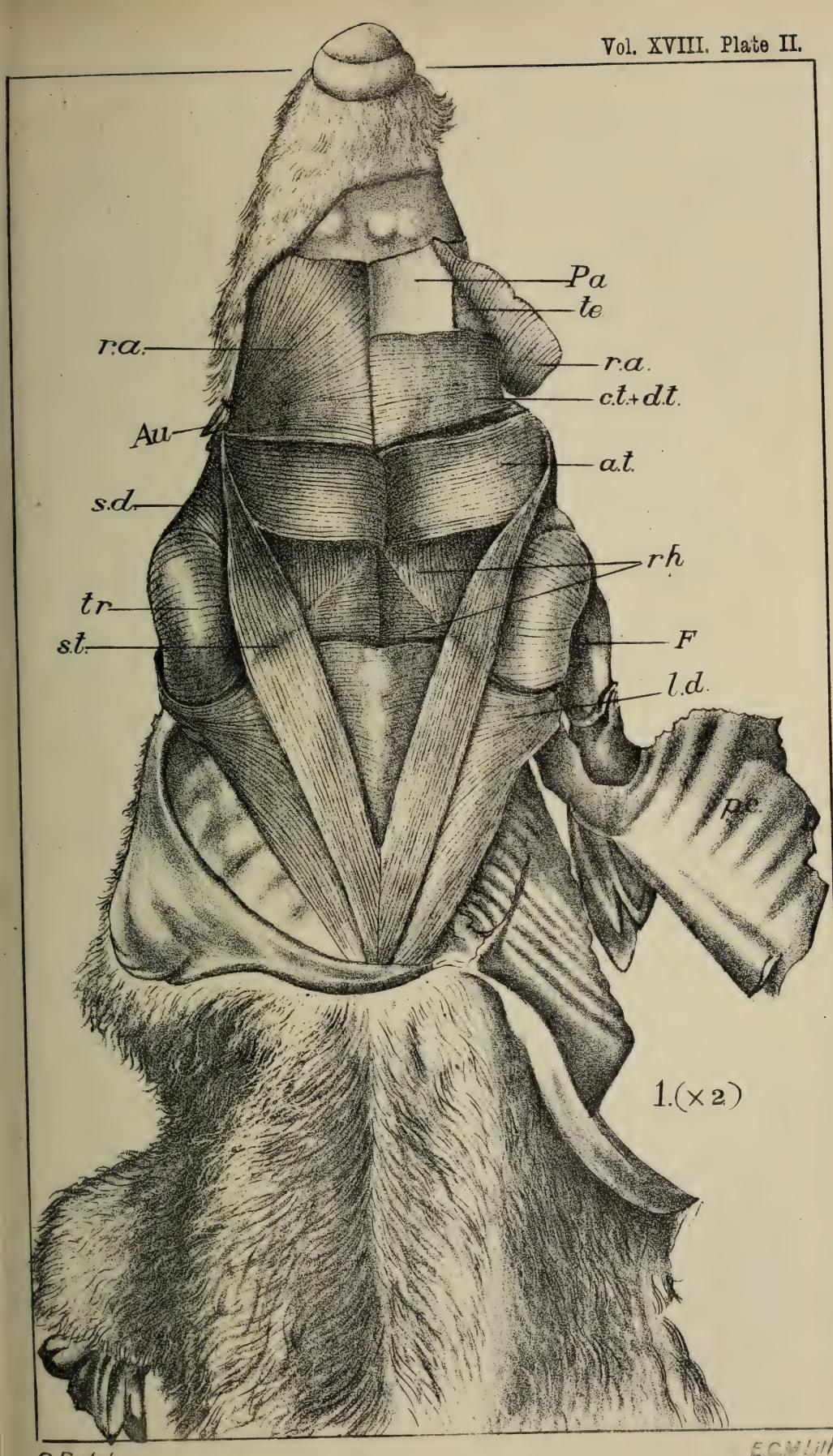
s.s. M. supraspinatus.
f.b.c. " biceps flexor antebrachii.
b.a. " brachialis anticus.
an.i. " anconeus internus.
f.rad. " flexor digitorum (radialis).
s.r.b. " supinator radii brevis.
f.c.u. " flexor carpi ulnaris (olecranon head).
p.r.t. " pronator radii teres.
e.c.r. " extensor carpi radialis.

s.tr. Surface of origin of scapular triceps.
d.p.t. Delto-pectoral tuberosity.
Ol. Tip of olecranon.
Ent. Entocondyle.
rad.sty. Styloid process of radius.
int.lig. Interosseous radio-ulnar ligament (inferior).
u.c.ligt. Very strong, thick, and tendinous-looking ulno-carpal ligament, proceeding from the palmar aspect of the lower end of the ulna to a prominent ridge of the scapho-carpal (to which also the anterior annular ligament is attached).

Plate XV.

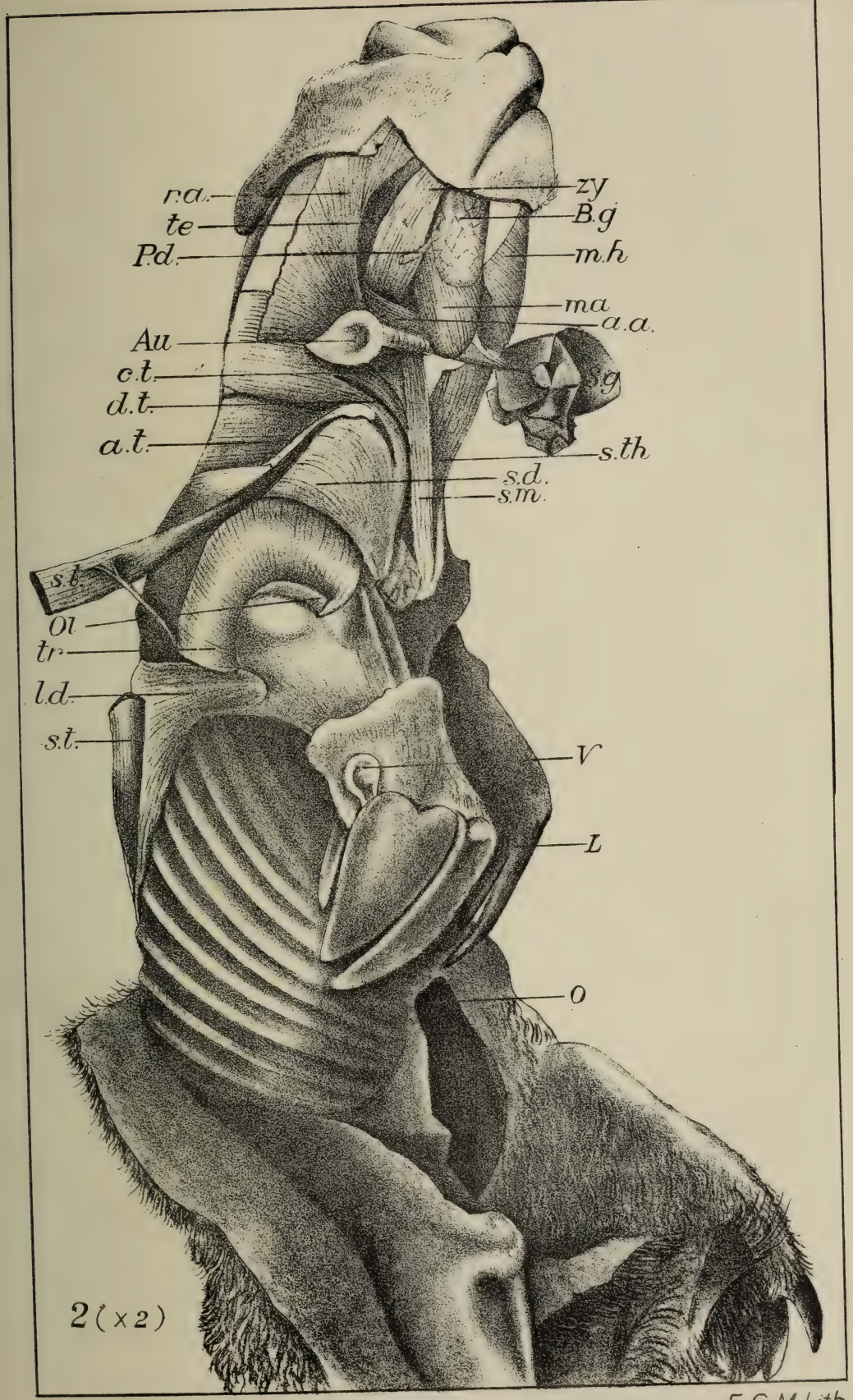
Fig. 16.—*Right anterior extremity: Deep dissection of dorsal aspect of forearm.*

ext. Origin from ectocondyle of superficial extensor muscles.
an.e. M. anconeus externus.
s.r.b. " supinator radii brevis.
e.c.u. " extensor carpi ulnaris (cut) and its tendon of insertion.
e.c.r. " extensor carpi radialis (cut).
e.c.d.1., *e.c.d.2.* " extensor communis digitorum tendons.
e.m.p. " extensor ossis metacarpi pollicis (abductor pollicis longus).
e.i.m. " extensor indicis et medii digiti.
Ol. Recurved tip of olecranon process.
III.-V. Claws of respective digits.



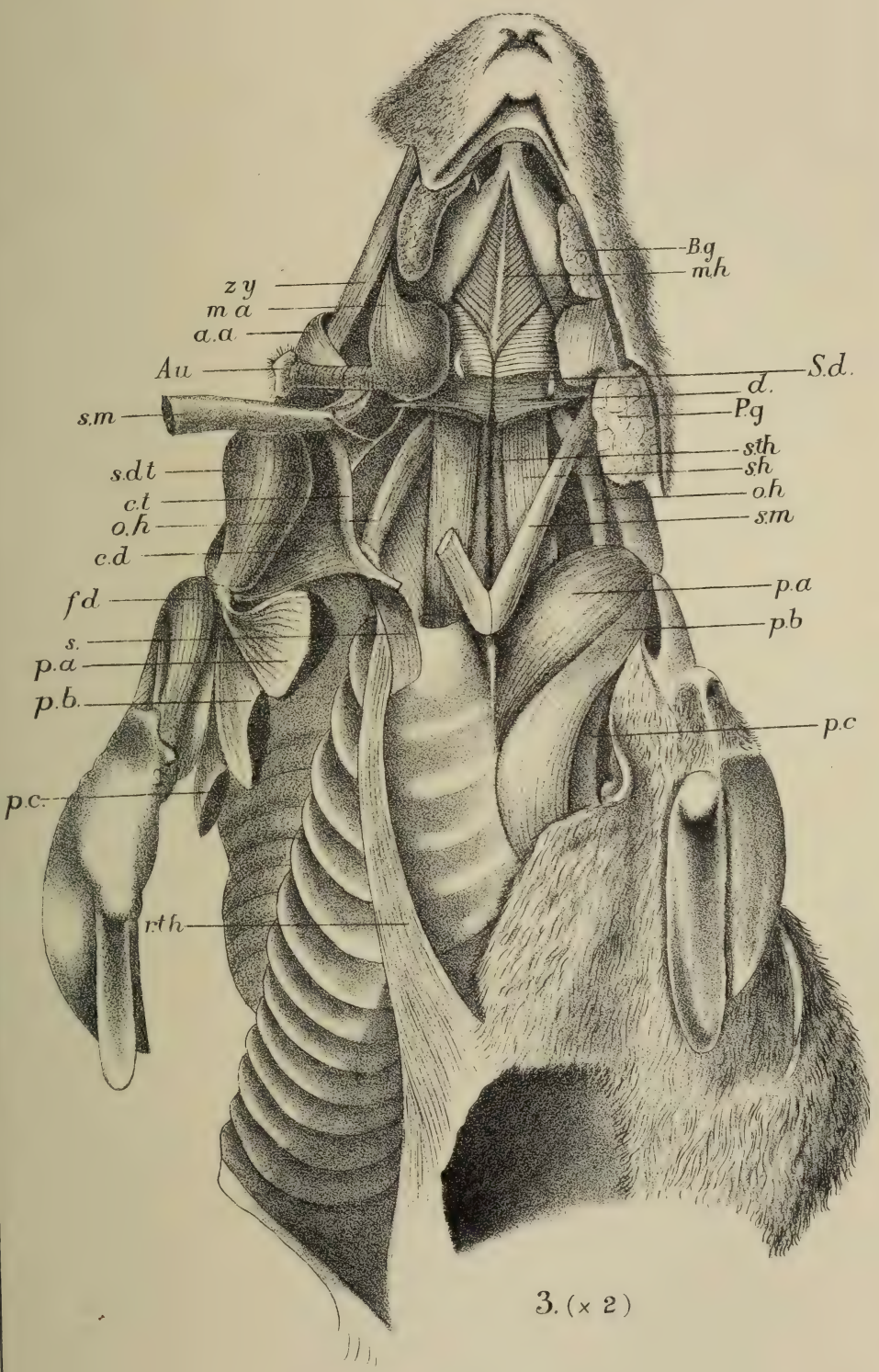
G.B.del.

E.C.M.Lith.

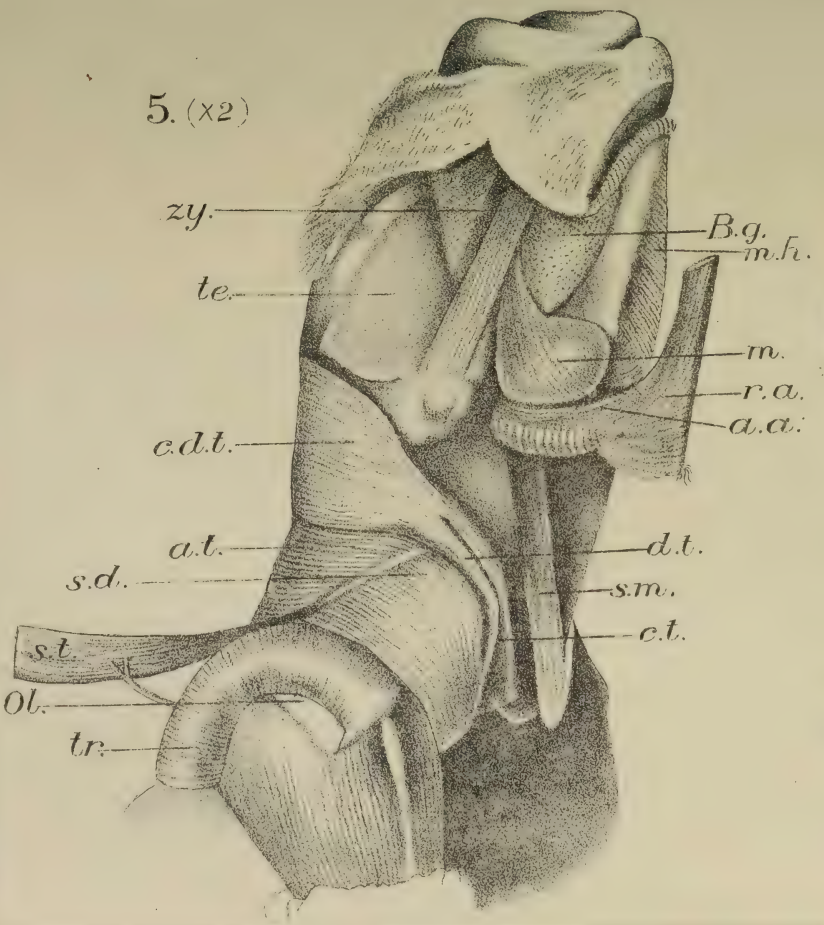


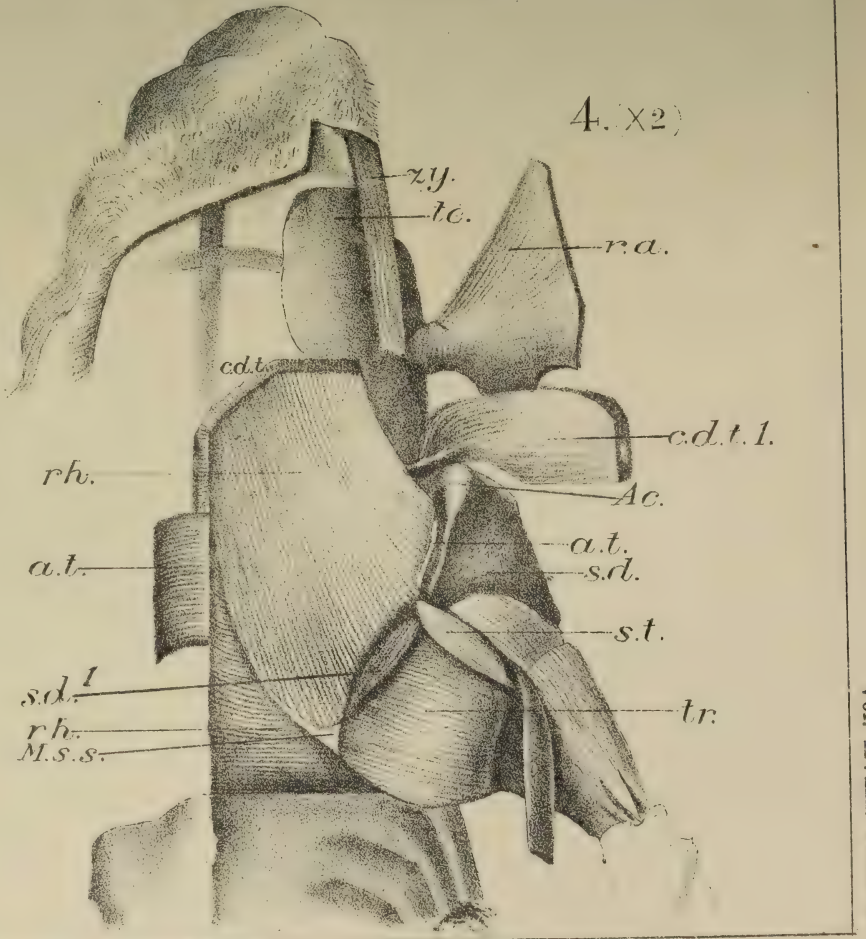
G.B.del.

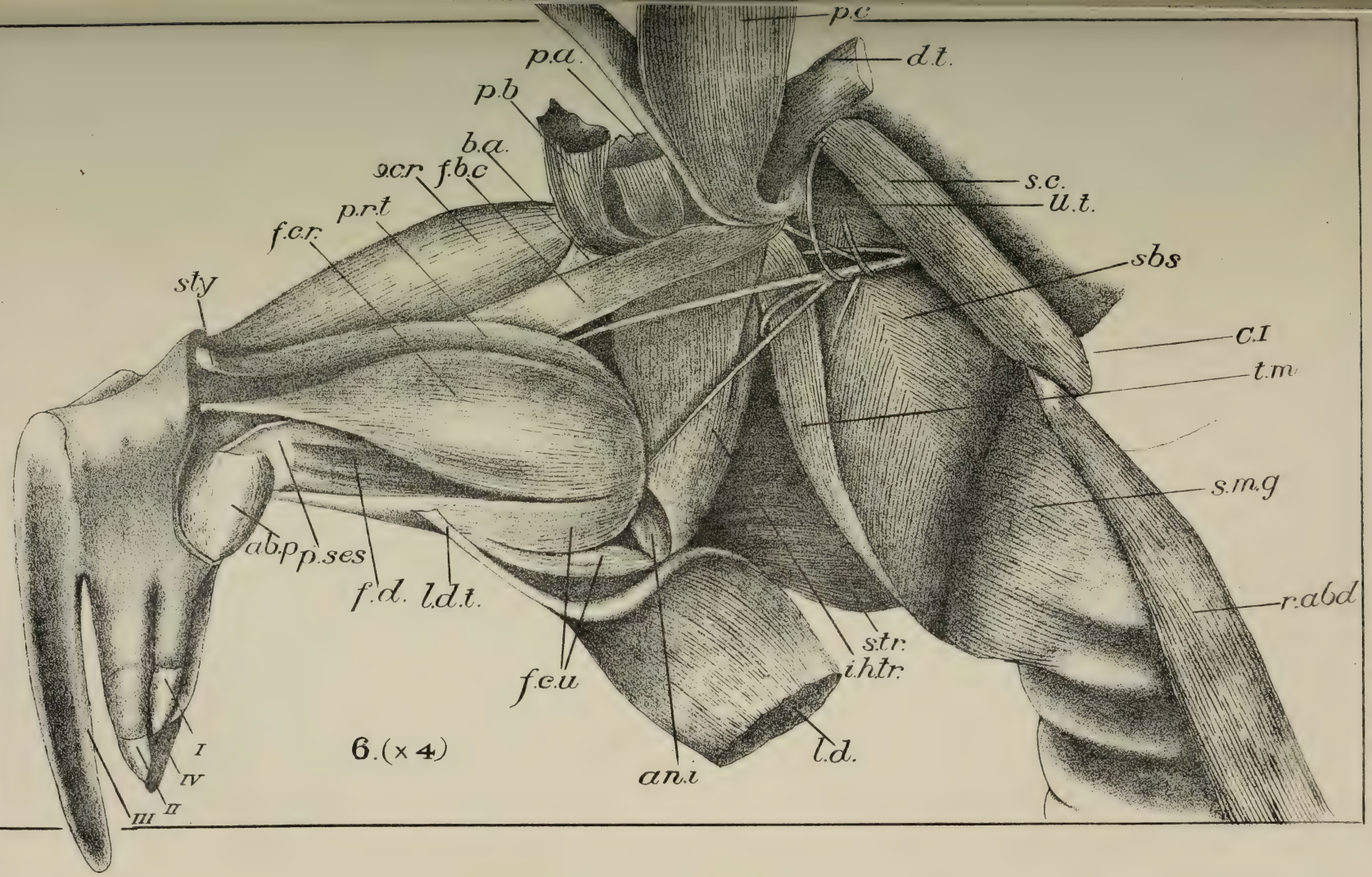
E.C.M.Lith.


Bg
m.h
z.y
m.a
a.a
Au
S.d.
d.
Pg
s.m
s.th
s.h
o.h
s.m
s.d.t
c.t
o.h
c.d
f.d
p.a
p.b
s.
p.a
p.b
p.c
p.c
r.th

3. (× 2)


5. (x2)
zy.
B.g.
m.h.
te.
m.
r.a.
a.a.
c.d.t.
a.t.
d.t.
s.d.
s.m.
c.t.
s.t.
Ob.
tr.

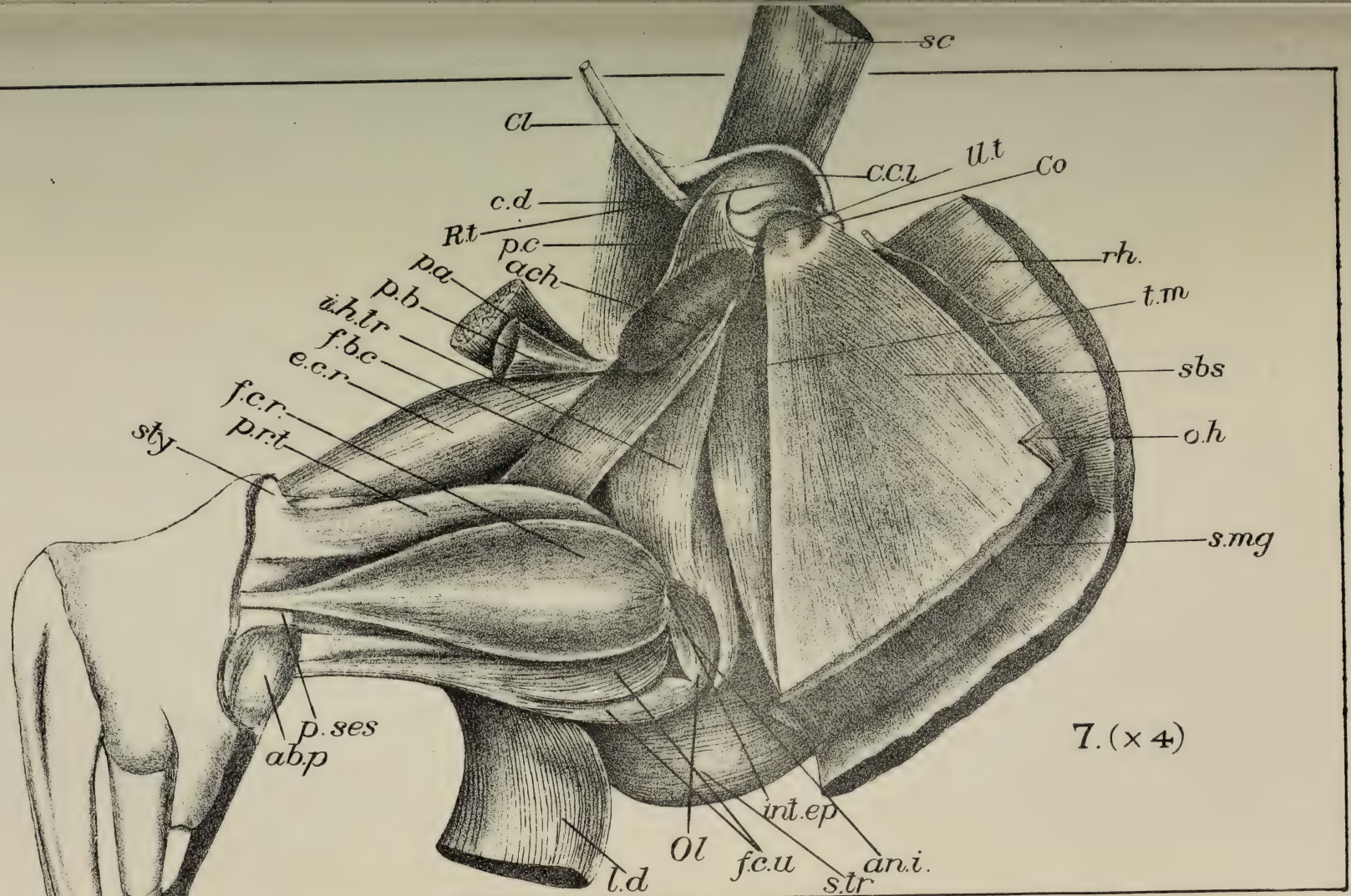

4. x2
zy.
tc.
r.a.
cd.t.
c.d.t.1.
rh.
Ac.
a.t.
a.t.
s.d.
s.t.
s.d.1
tr.
rh.
M.s.s.



C.B.del.

E.C.M.Lith.

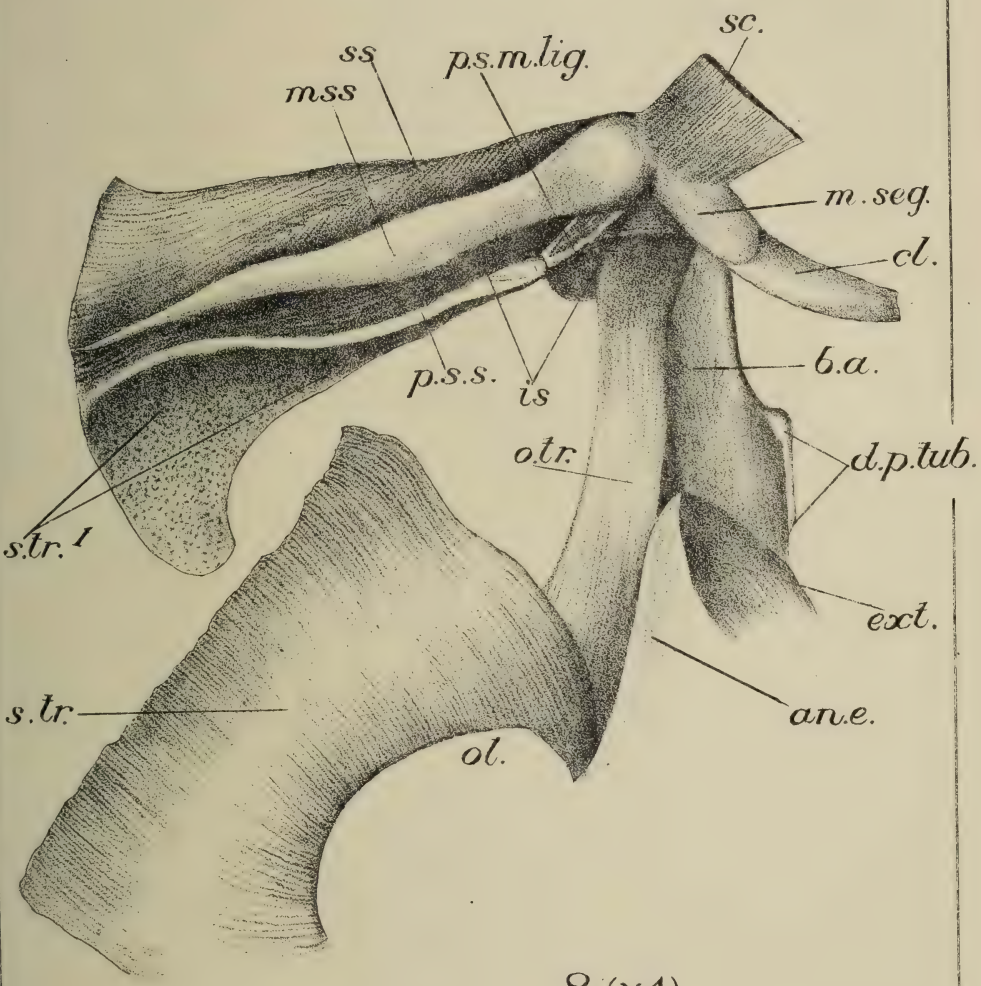
Vol. XVIII. Plate VI.



G.B. del.

E.C.M. Lith.

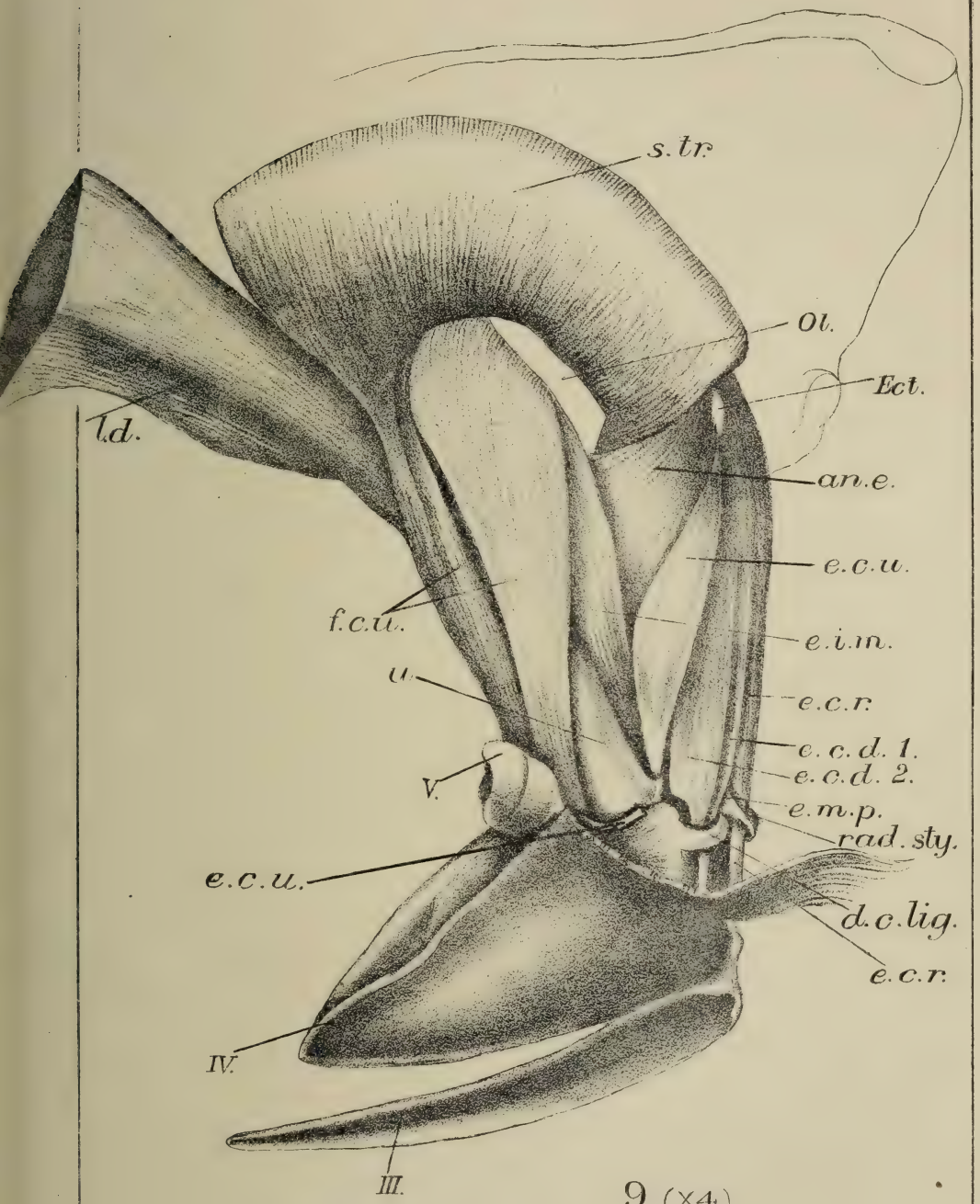
Vol. XVIII. Plate VII.



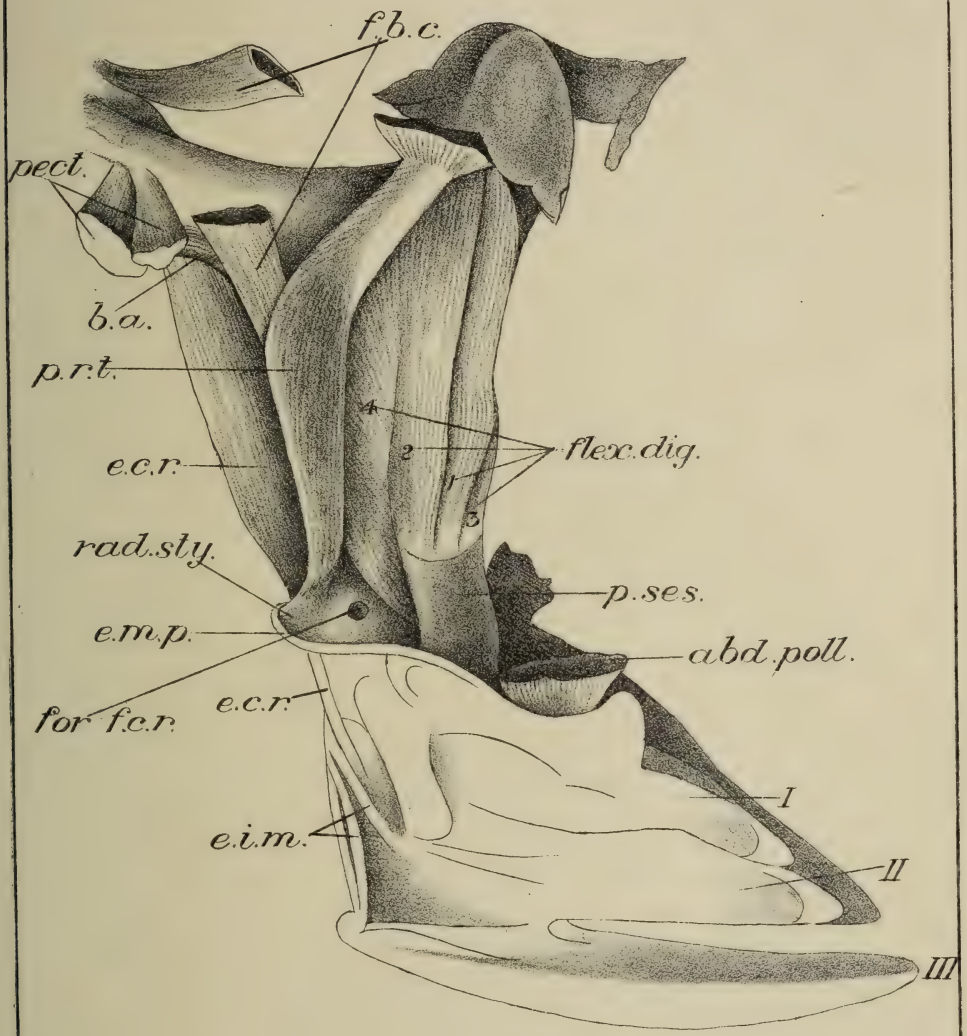
8.(×4)

G.B. del.

E.C.M. Lith.


s.tr.
Ol.
Ect.
an.e.
l.d.
e.c.u.
f.c.u.
e.i.m.
u.
e.c.r.
e.c.d. 1.
e.c.d. 2.
V.
e.m.p.
rad. sty.
e.c.u.
d.c.lig.
e.c.r.
IV.
III.

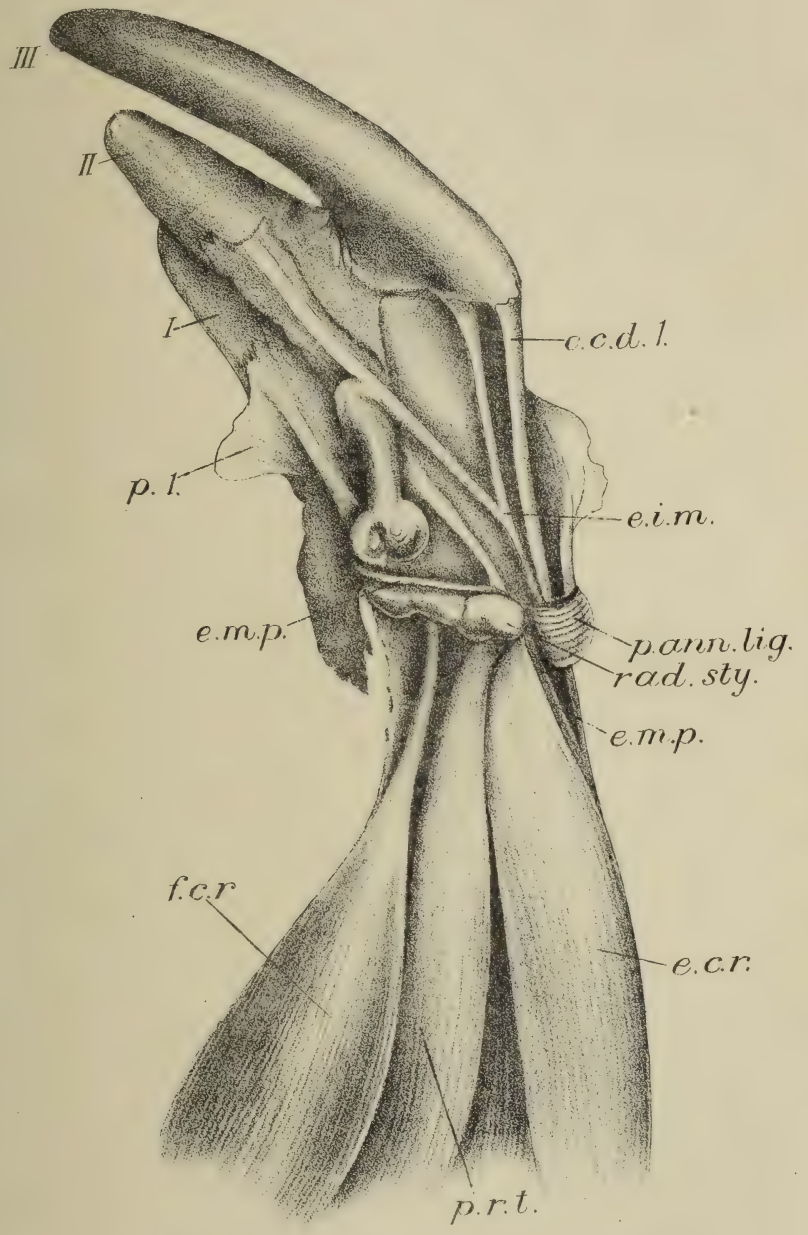
9. (×4.)



10. (×4)

G.B. del.

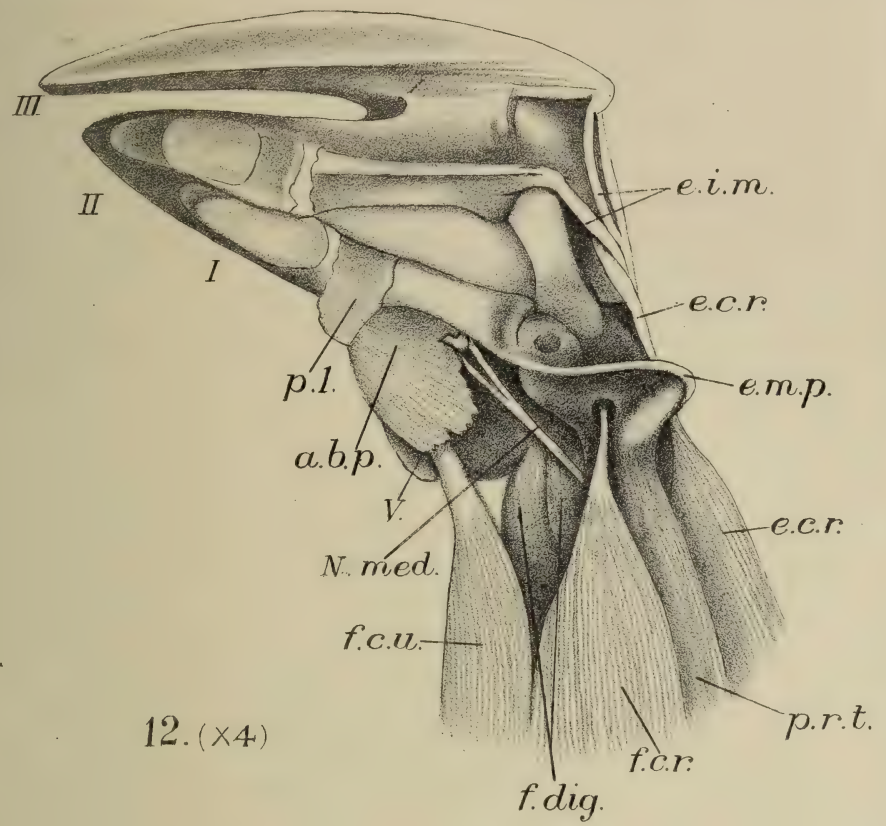
E.C.M. Lith



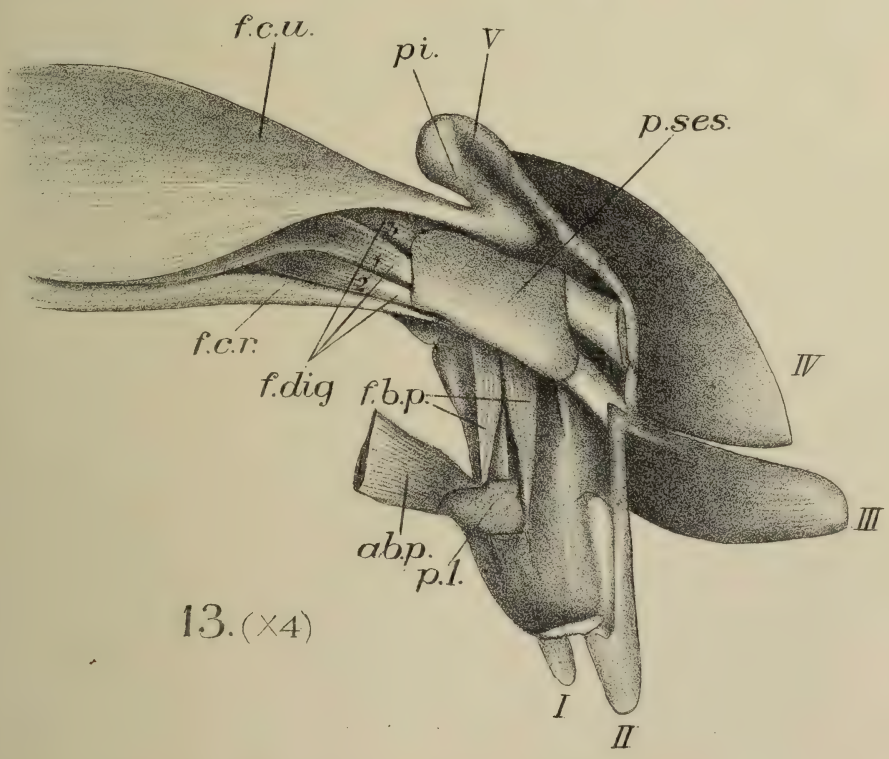
II. (×4)

G. B. del.

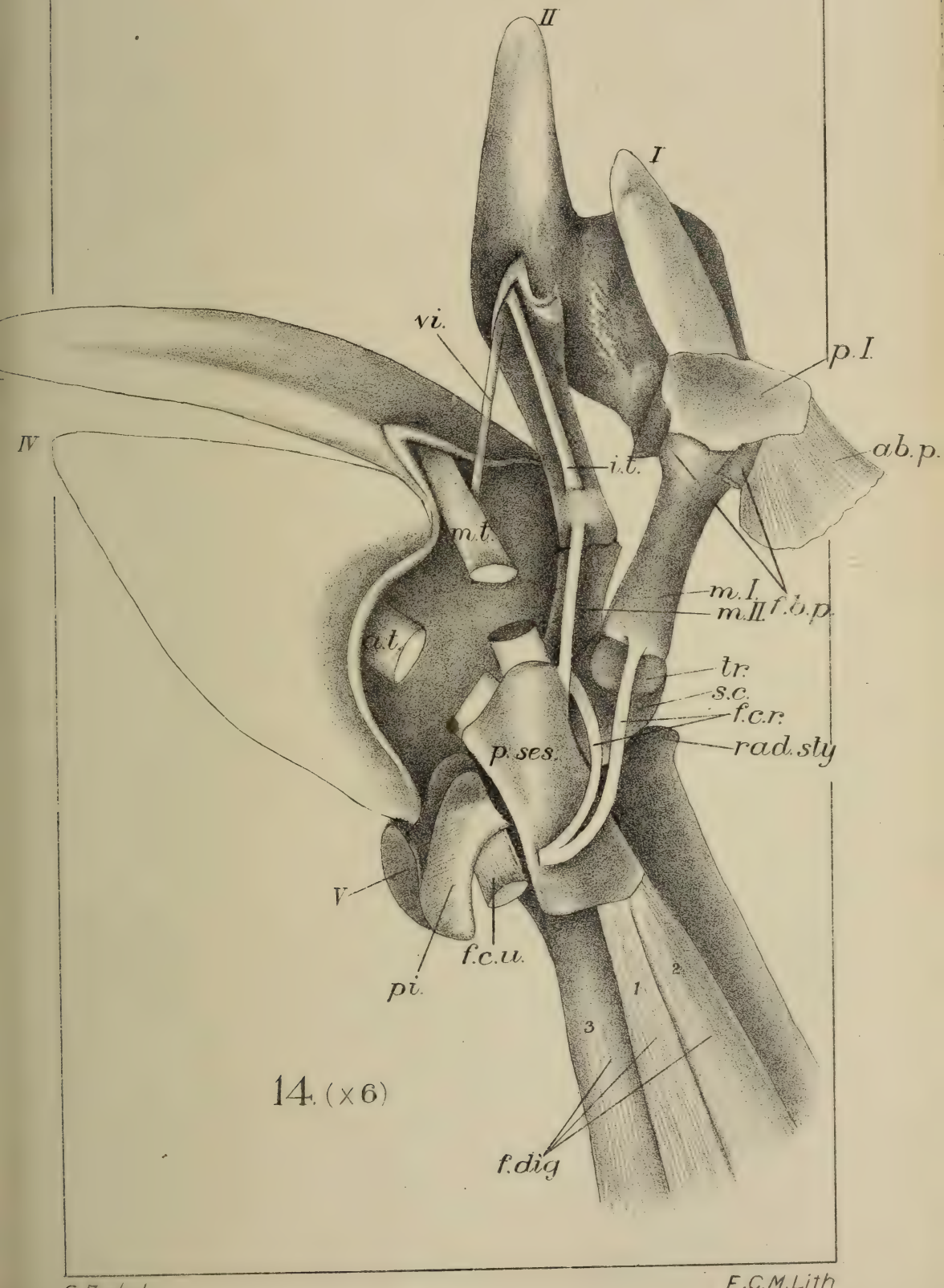
E.C.M. Lith


III
II
I
e.i.m.
e.c.r.
p.l.
e.m.p.
a.b.p.
V.
e.c.r.
N. med.
f.c.u.
p.r.t.
f.c.r.
f.dig.

12. (×4)


f.c.u.
pi.
V
p.ses.
1
2
f.c.r.
f.dig
f.b.p.
IV
III
abp.
p.l.
I
II

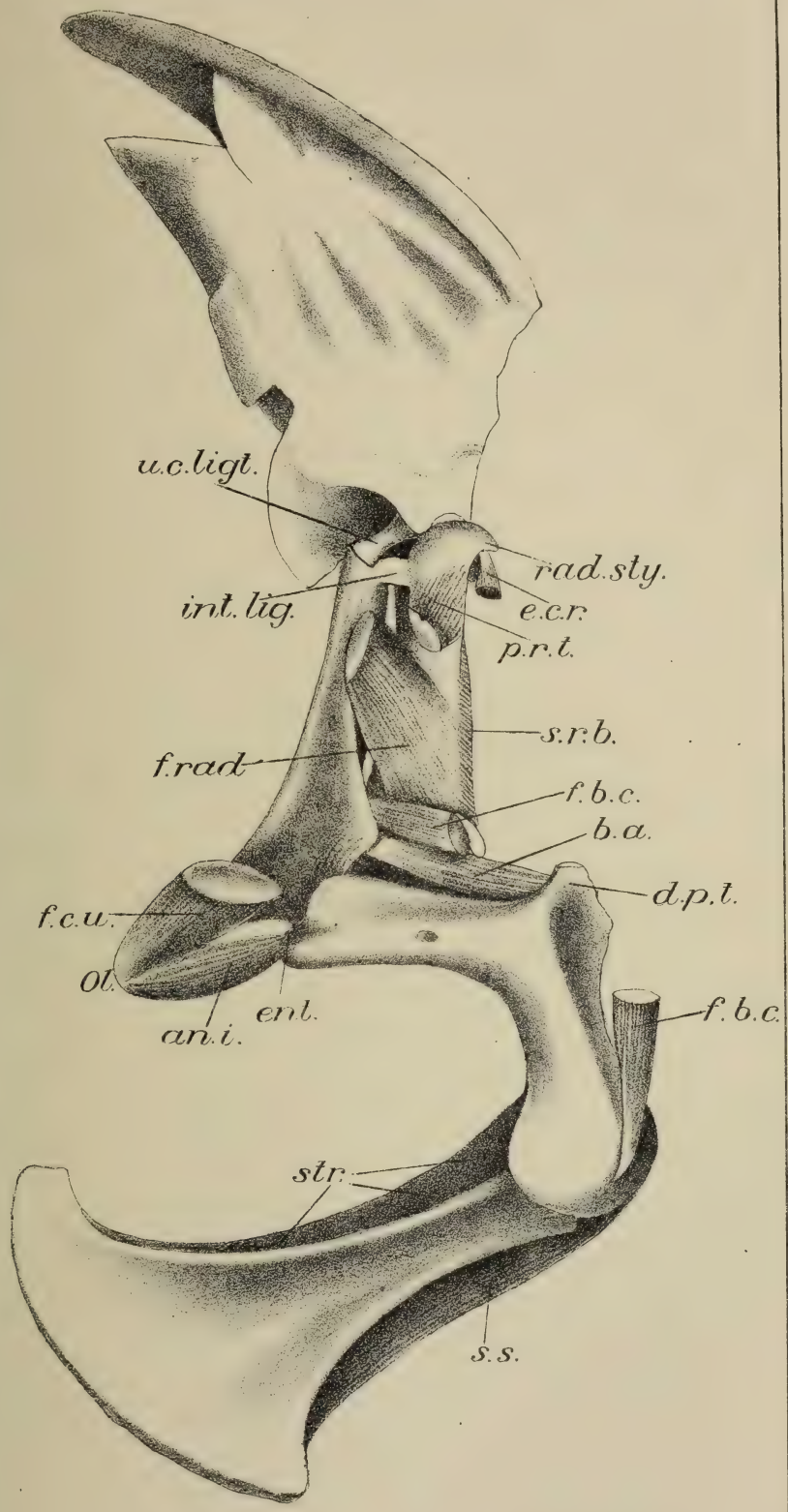
13. (×4)



14. (×6)

G.B. del.

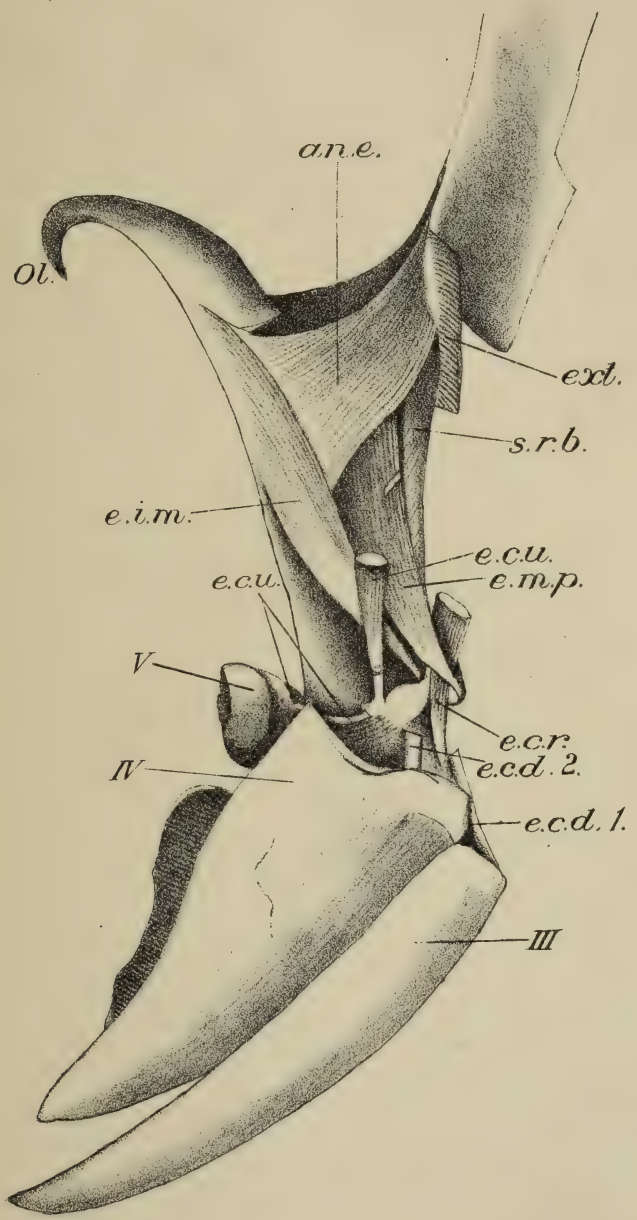
E.C.M. Lith



15. (× 4)

G.B.del

E.C.M. Lith



16. (×4)

G.B. del.

E.C.M Lith

Notes on a New Classification of the Brachyscelidæ.

By W. W. Froggatt, Tech. Mus., Sydney, N.S.W.

(Communicated by Oswald B. Lower, F.E.S.).

[Read April 3rd, 1894.]

[Abridged.]

In the last Part of the Transactions of your Society, there is a paper entitled "Descriptions of South Australian Brachyscelid Galls," by J. G. O. Tepper, F.L.S., upon which I beg the favor of being allowed to make the following remarks.

In this paper he ignores my classification of the coccids, which is clearly stated and defined on the form, spines, tubercules, and anal appendages of the female insect. He passes over the coccids with a few brief notes, in which he alters my term "anal appendages" into "tail bristles"—a very misleading term, as they are certainly not at all like bristles, being hard, stout, and awl-shaped.

Mr. Tepper makes a new classification of the family from the galls produced by the insects, and passes over the latter, which, with one exception, he does not even describe in his *new species*.

He says "a characteristic specific difference appears to be exhibited in the direction of the axis of the gall," and on this basis gives a classification of the described galls. Now, this vertical, lateral, or dependent form can often all be found in a series of one species, and is of no value for classification. It is impossible to classify galls of any genus, without an exact knowledge of the insects that form them; and, until Mr. Maskell and I have published our recently read papers, it is simply a waste of time making a classification of the family and genera. He says—"All Brachyscelid galls have a minute opening or aperture at or near the summit, or *exceptionally* at the base." If he had known anything about the genera *Opisthoscelis* and *Ascelis* he would have found that the opening was oftener at the base than the apex.

Again, Mr. Tepper says "that regarding the duration of the life of the *gall*, or insect, nothing definite seems to be known," but from his own observations, it may take several years to produce some of the larger woody galls. Now, the giant among them all (*B. duplex*, Schrader) never takes more than a season to become fully developed, and others, as *B. pileata*, Schrader, when

infesting young, vigorous saplings, grows with wonderful rapidity; the younger and more sturdy the tree, the quicker it grows.

Having dealt with Mr. Tepper's classification, I should like to make a few remarks upon his so-called new species, most of which are described from aborted or abnormal forms of very common species already described. If a classification of the galls were admissable, there would be no end to new species, as many as a dozen varieties of many of the galls being obtainable from several species, all of which could be easily placed if the full-grown female were examined.

Not content with dealing with the Brachyscelid proper, Mr. Tepper figures and describes a gall on *Beyeria opaca* as a new Brachyscelis, without the least idea of what insect formed it. The figures show a very variable gall, which might be formed by anything. The genus Brachyscelis only form galls on species of Eucalyptus.

Ascelis multitudinea, Tepper, is treated in the same manner. The galls figured are not like any *Ascelis* known to me, but very much like the galls of a *Psylla*, while the insect figured as the gall-maker, evidently an inquline, is not a female coccid of this group.

The following "new species," according to Mr. Tepper's descriptions and drawings, are synonymes of other species :—

(2) Brachyscelis ovicoloides, Tepper, is the curved form of *B. pileata*, Schrader, if the section was taken as typical; if the gall, it is an aborted *B. ovicola*, Schrader.

(3) B. regularis, Tepper, is the broad, short-stemmed form of *B. pedunculata*, Olliff.

(4) B. glabra, Tepper, is an abnormal form of *B. ovicola*.

(5) B. subconica, Tepper, is one of the very common forms of *B. conica*, Froggatt.

(6) B. urnalis, Tepper, is *B. Schraderi*, Olliff, found in the western parts of N.S. Wales.

(7) B. strombylosa, Tepper, is *B. crispa*, Olliff, a very common gall about Sydney.

The last two, called *B. calycina* and *B. Neumanni*, are new; but as they both come from the same locality, and allied, if not the same species of Eucalyptus, it is most likely that they are only varieties of one species; but this can only be settled by examining females from each species.

I think I have proved that Mr. Tepper has, by the recent contribution to our knowledge of the gall-making coccids, in his haste to make new species, without a sufficient grasp of the subject, added little new, and heaped up synonyms that will bother all future students.

New Australian Heterocera.

By Oswald B. Lower, F.E.S., &c.

[Read May 1, 1894.]

HEPIALIDÆ.

Hepialus thermistis, *n. sp.*

Female, 108 mm. Head, thorax, palpi, abdomen, antennæ and legs ochreous-fuscous. Forewings elongate-triangular. Costa slightly sinuate in middle; ochreous-fuscous, strigulated more or less with darker; costa with a few obscure darker quadrate spots; traces of an irregular darker band from costa at three-fourths to inner margin at three-fourths, most distinct in middle. Cilia ochreous-fuscous mixed with whitish. Hindwings with hindmargin rounded; vermillion pink; cilia as in forewings. Underside of both wings vermillion pink. This species is very different from any other known Australian species

One specimen from Mackay, Queensland.

Hepialus Cyanochlora, *n. sp.*

Male, 70-74 mm. Head and thorax grass-green, palpi whitish; abdomen reddish, posteriorly greenish tinged, anterior legs dull purplish, tibiæ with a broad band of green, other legs reddish tinged. Forewings elongate-triangular, costa slightly sinuate in middle, hindmargin bowed; pale grass-green, shading into opalescent blue in certain lights, crossed by several transverse strigulæ or correlated bands of opalescent whitish; a slightly curved oblique white fascia from three-fourths costa to beyond middle of inner-margin, edged posteriorly by a dark-green line, anteriorly suffused into ground-colour; costa purplish-fuscous in middle, with three small whitish-green spots at equal distances; cilia opal-whitish, tinged with green. Hindwings with hindmargin rounded; pale opalescent blue; costa and hairs at base salmon-pink.

Two specimens at Mackay, Queensland, in December. My specimens are not in the best condition, but quite good enough to denote a peculiarly beautiful species.

BOMBYCIDÆ.

Pinara erubescens, *n. sp.*

Male, 50 mm.; female, 75 mm. Head, palpi, legs and thorax ochreous, terminal joint of palpi purplish-red. Abdomen ochreous-

whitish, in male tinged with yellow; tibiæ and tarsi fuscous-purple; patagia fuscous-purple. Antennæ fuscous-purple, pectinations yellowish. Forewings elongate-triangular; costa gently arched, hindmargin obliquely rounded; ochreous-pinkish, or pale flesh colour, slightly darker posteriorly, veins neatly outlined with yellow. Costa at base with a small spot of fuscous-purple; a reddish discal dot at one-third of disc. Hindwings with hindmargin rounded, colour as forewings, in male strongly tinged with orange towards hindmargin in middle; tinged on costa with darker pink; cilia yellowish-white.

Very similar to "*fervens*," but a much more chaste insect. The cocoon of this is rugose, and of a pale-pink colour. Two pair bred by Mr. G. Barnard, Duaringa, Queensland. The typical insects are in the collection of the Brisbane Museum.

NOTODONTIDÆ.

Notodonta cycnoptera, *n. sp.*

Male, 46 mm. Head, palpi, antennæ, abdomen and thorax ashy-grey whitish. Thorax more whitish, with a large dark-fuscous wedge-shaped patch. Antennal pectinations eight; apical one-fifth simple. Legs very hairy, white; tarsi fuscous, with whitish apical rings. Forewings elongate triangular, costa straight, arched towards apex, apex round-pointed, hindmargin obliquely rounded; ashy-grey-whitish; a white basal patch, bounded by an irregular blackish line from beyond one-fourth of costa to about one-third inner-margin; in this patch are two short black spots or streaks, one on costa in middle and one in middle of base; a strongly irregularly dentate black line, posteriorly edged with white, from about three-fourths of costa to near anal angle, with two acute projections, above and below middle veins beyond this outlined suffusedly with black; a lunate white mark at end of cell; a suffused, rather thick, waved white subterminal line; a black hindmarginal line, somewhat interrupted at extremities of veins; cilia ashy whitish, darker at apex. Hindwings with hindmargin rounded; white, with a broad black hindmarginal band, broadest at apex, hardly reaching anal angle; cilia white, with a narrow blackish basal line.

Two specimens, Duaringa, Queensland, in March. (Coll. Barnard.)

Geometrina.

HYDRIOMENIDÆ.

Hydriomena callizona, *n. sp.*

Male, 30 mm. Head, palpi, thorax and abdomen dark-fuscous, abdomen with second segment broadly white. Legs and antennæ greyish, antennal ciliations one-sixth, palpi one and a-half. Fore-

wings triangular, hindmargin waved, rounded, oblique; dark-fuscous; posterior edge of basal patch from one-eighth, costa to one-eighth inner-margin, somewhat curved; anterior edge of median band from one-third of costa to one-third inner-margin, strongly dentate, and curved inwards; posterior edge from two-thirds of costa to two-thirds inner margin, contracted on inner margin, with a moderate bidentate projection above middle; a large black discal dot between, but nearest anterior line; the ground-colour between basal patch and anterior line of median band is occupied, except along costa, by a large white blotch; a similar white blotch above anal angle, suffused with ground-colour towards hindmargin; a moderate rounded white spot on middle of hindmargin, and an irregular white blotch immediately above, curved towards apex, but not reaching it; a black hind-marginal line, interrupted by ochreous-white spots at extremities of veins; cilia light fuscous. Hindwings with hindmargin waved; colour hindmarginal dots and cilia as in forewings, white blotches absent, posterior edge of median band nearly straight, from two-thirds of costa to two-thirds inner margin, limited by a blackish dot-like line, immediately followed by a fine dark fuscous line. An abnormal-looking species, unlike anything I have previously seen. It approaches somewhat "*brujata*," Gn., but I hardly think it is a variety of that species.

One specimen; Billopp, Tasmania, in February (Coll. Barnard).

XANTHORHOE (?) PLATYDESMA, *n. sp.*

Female, 31 mm. Head, palpi, antennæ, thorax, and abdomen deep chocolate; thorax with a blackish suffused anterior band. Legs fuscous, post pair greyish. Forewings triangular, costa moderately arched, hindmargin waved, obliquely rounded; deep chocolate, anterior edge of basal patch limited by a fine obscure whitish line, immediately followed by a thick black streak or transverse band, median portion of median band wholly suffused with ochreous-whitish, and containing numerous irregular waved fuscous transverse lines, anterior edge from about one-third of costa to one-third inner margin, posterior edge from three-fourths costa to three-fourths inner margin, with a bidentate projection in middle, suffusedly edged with whitish-ochreous throughout, veins beyond irregularly dotted with whitish-ochreous; subterminal line formed by whitish-ochreous dots, the middle one much larger and conspicuous; a waved black hindmarginal line; cilia fuscous-chocolate. Hindwings with hindmargin waved, rounded; deep chocolate; veins dotted here and there with numerous whitish-ochreous spots; markings obliterated, except posterior edge of median band, which appears as a fuscous-curved line, dotted on veins with blackish, and edged posteriorly on inner

margin with ochreous-whitish ; hindmarginal line and cilia as in forewings. Between *repentinata*, Walk., and *anaspila*, Meyr. The ground is different from any other species I am acquainted with.

One specimen in December. Duaringa, Queensland (Coll. Barnard).

XANTHORHOE PELOCHROA, *n. sp.*

Male, 25 mm. ; female, 25. Head, palpi, thorax, abdomen, and legs dark-fuscous ; palpi one and a half, posterior legs ochreous-tinged, abdomen in male with pairs of black dots at base of segments, in female with black segmental rings and a minute yellowish spot on dorsum at base of segments, second segment paler. Antennæ fuscous, pectinations six. Forewings triangular, hindmargin waved, obliquely rounded ; dull ochreous-fuscous, darker in male, with numerous waved transverse lines, and with a few minute white scattered dots ; outer edge of basal patch hardly traceable, in male followed by a row of obscure minute black dots ; median band hardly darker than ground-colour. Anterior edge from beyond one-third of costa to one-third inner margin, curved inwards somewhat ; posterior from near three-fourths of costa to two-thirds inner-margin, with a moderate blunt projection in middle ; a well-defined, sometimes obscurely-whitish edged black discal dot in middle ; a somewhat thick, irregular, crescentic light-ochreous mark above, and immediately following angulation of median band ; an irregular, triangular, apical patch of dull-ochreous, from which proceeds a fine subterminal line of same colour ; not in female. A waved, fine, black, hindmarginal line ; cilia ochreous-fuscous, tips whitish. Hindwings with hindmargin waved, rounded ; dull-fuscous, with numerous waved, darker, transverse lines, more distinct on inner-margin ; a black discal dot at one-third from base above middle ; a broad, irregular, waved, ochreous band from middle of costa to middle of inner margin ; obsolete in female ; a similar but more suffused band immediately before hindmargin ; not traceable in female. Hindmarginal line and cilia as in forewings.

Two specimens from G. Lyell, jun., Gisborne, Victoria. It comes nearest "*repentinata*," Walk. ; the lunate mark beyond median band is a good recognisable character.

MONOCTENIADÆ.

NEARCHA DIDYMOCHROA, *n. sp.*

Female, 29 mm. Head, thorax, legs, and abdomen pale ashy-grey. Antennæ ochreous ; palpi dark-fuscous, 1½. Forewings triangular, costa hardly arched, apex acute, hindmargin slightly sinuate beneath apex, thence bowed, oblique ; pale-ashy-grey or

slate colour ; a very indistinct black line from before one-third of costa to one-third inner-margin ; a small median black discal spot ; a fine black line from four-fifths of costa to beyond three-fourths of inner-margin, with a sharp angulation beneath costa ; a similar parallel line, starting from bend of angulation marked with irregular wedge-shaped spots posteriorly. Between the two lines the ground-colour is pale-ochreous-yellow ; veins between lines and hindmargin neatly outlined with black, and with a row of hindmarginal dots at extremities ; cilia grey-whitish. Hindwings with hindmargin rounded ; colour, hindmarginal and discal dots as in forewings, first line obsolete, second and third as in forewings, without angulations, and not reaching costa.

Two specimens Duaringa, Queensland, in August (Coll. Barnard). Distinct by the angulated lines. The heads of the specimens are not in good condition, having become mildewed.

EPIDESMIA THERMISTIS, *n. sp.*

Female, 32 mm. Head, palpi, and thorax reddish-fuscous, thorax posteriorly fuscous. Abdomen and legs greyish-ochreous. Forewings elongate triangular ; costa hardly arched ; hindmargin bowed, obliquely rounded ; reddish-fuscous, darker posteriorly ; costal edge red throughout, edged suffusedly beneath by a thicker blackish-shade throughout ; a dull, reddish-fuscous spot on inner-margin, at about one-fourth ; a large, roundish, blackish discal spot beyond middle of disc above middle ; an ochreous-red, straight line from beneath costa at five-sixth to inner at four-fifth, posteriorly edged by a broad, blackish band, inclined to be separated into large spots, which are centred by smaller and blacker spots ; area beyond this coppery-fuscous ; a hindmarginal row of black spots ; cilia ochreous-reddish tinged. Hindwings with hindmargin rounded, slightly prominent towards apex ; greyish-white, becoming broadly light-fuscous towards hindmargin ; hindmarginal dots and cilia as in forewings.

One specimen at Uraidla, South Australia, in November. In general appearance resembles a *Nearcha*.

DICHROMODES ORTHOGRAMMA, *n. sp.*

Male, 22 mm. Head, palpi, thorax, and abdomen fuscous-leaden, minutely dusted with leaden-white. Antennæ whitish, annulated with fuscous ; ciliations three and a half, palpi two and a half. Legs greyish. Forewings triangular ; costa nearly straight, hindmargin bowed, oblique ; fuscous-leaden, minutely dusted with whitish, markings dark fuscous ; a line from beyond one-third costa to one-third inner-margin, slightly sinuate beneath costa ; an almost straight line, somewhat dot-like, from three-fourths costa to two-thirds inner-margin, edged posteriorly by an

equal width of whitish ; a discal spot midway between the two fuscous lines. Subterminal line fuscous, strongly waved throughout and indistinctly edged posteriorly with whitish ; a black interrupted hindmarginal line ; cilia fuscous-whitish, terminal half grey-whitish. Hindwings with hindmargin rounded, fuscous ; hindmarginal line and cilia as in forewings ; a small black dash on inner margin beyond middle, edged with whitish, below which is a small piece of ground colour as in forewings.

Two specimens, Duaringa, Queensland, taken in November (Coll. Barnard). Nearest *estigmaria*, Walk. ; the antennal pectinations put it out. It is not unlike, superficially, a large *ischnota*, Meyr.

Xenomusa tetramera, *n. sp.*

Female, 40 mm. Head, thorax, and abdomen pale-ochreous, with a few scattered minute fuscous scales ; thorax posteriorly with a fuscous patch, and two small fuscous dots on first segment of abdomen. Legs greyish-ochreous, somewhat infuscated. Palpi fuscous ; antennæ yellow, dotted with fuscous. Forewings triangular ; costa strongly arched near base, thence tolerably straight ; apex acute, hindmargin strongly waved, bowed, oblique ; pale greyish-ochreous, minutely scattered with small dark-fuscous scales ; four transverse dark-fuscous bands—First, thick, curved outwards from one-fifth costa to one-fifth inner-margin ; second, from one-third inner-margin to three-fourths across wing, surmounted by a well-defined fuscous discal dot ; third, moderately broad, from about three-fourths of costa to about middle of inner-margin, gently curved inwards throughout ; fourth, thick, irregular, interrupted above and less strongly below middle, at apex expanded as a suffused patch ; a hindmarginal series of obscure fuscous spots ; cilia ochreous-grey. Hindwings with hindmargin strongly waved ; colour, markings, &c., as in forewings, but markings not so well defined ; first line absent.

One specimen, Victoria (in National Museum).

Onychodes euchrysa, *n. sp.*

Male, 45 mm. Head, legs, palpi, abdomen, and thorax yellow ; second segment of abdomen purplish. Antennæ whitish, pectinations ochreous. Forewings triangular ; costa gently arched, somewhat abrupt at base ; hindmargin obliquely rounded ; bright yellow, strigulated with dull purplish, more especially along costa throughout ; a small blackish dot above inner-margin at one-sixth, another similar obliquely above and beyond ; a blackish median discal dot ; an indistinct outwards-curved purplish streak from one-third of costa to one-third inner-margin ; an irregular thick dentate purplish streak from apex of wing to inner-margin and there meeting first streak ; an indistinct row of small fuscous

dots from costa before apex to one-half across wing; a hindmarginal row of blackish dots; cilia golden-yellow. Hindwings with hindmargin slightly crenulate, rounded; colour and markings as in forewings, but first streak straight. Forewings beneath pale-whitish-yellowish; a strongly dentate reddish line from costa at four-fifths to three-fourths across wing. Hindwings with colour and markings as in forewings.

One specimen, Mulgrave River, Cairns, Queensland, in February (Coll. Barnard).

ARRHODIA ORTHOTOMA, *n. sp.*

Male, 42 mm. Head, thorax, palpi, legs, and abdomen greyish-ochreous; abdomen sparsely irrorated with small black scales; thorax with a suffused anterior band. Antennæ greyish, pectinations four. Forewings triangular; costa straight, apex rounded, hindmargin hardly waved, somewhat sinuate below apex, thence oblique; greyish-ochreous, suffusedly irrorated with fuscous; a dark fuscous, rather thick line from beyond one-third of costa to one-third inner-margin, with a strong angulation immediately beneath costa; a similar line edged posteriorly with a suffused row of dark fuscous spots from three-fourths of costa to beyond middle of inner-margin; space between the first and second lines suffused with whitish, especially on lower half, where it is strigulated with fuscous; the upper half contains two quadrate spots just below angulation of second line; costa from first line to apex rather broadly paler greyish-ochreous, attenuated anteriorly; a suffused fuscous spot on costa near apex; cilia fuscous. Hindwings with a deep concavity at apex, making apex prominent, thence broadly waved, rounded; colour, except along hindmargin, where it is greenish tinged, and markings same as in forewings, but quadrate spots and first line absent; a small transparent discal spot outlined with dark fuscous placed on second line; cilia as in forewings.

One specimen, Duaringa, Queensland (Coll. Barnard). I have seen a second specimen. In general appearance superficially resembling *Monoctenia obtusata*, Walk. It has a curious character in possessing the transparent discal spot so common to that genus; the antennæ, however, refer it to *Arrhodia*.

MONOCTENIA ODONTIAS, *n. sp.*

Female, 34 mm. Head, antennæ, and palpi reddish-crimson; palpi whitish towards base. Legs ochreous-whitish, banded and spotted with dull crimson. Thorax fleshy-white; abdomen fleshy-grey. Forewings triangular; costa nearly straight, arched at apex; apex acute, hindmargin strongly dentate, somewhat sinuate in middle; greyish-flesh colour, costa yellowish, strigu-

lated with fuscous-purple; a very indistinct fuscous discal dot; a small cuneiform spot on costa at three-fourths, from which proceeds a curved row of suffused indistinct dots to beyond middle of wing; a suffused leaden-purplish mark on inner-margin before anal angle; cilia white, basal half purplish-fuscous. Hindwings with hindmargin rounded, dentate; apex and middle dentation prominent; a hardly perceptible waved line (dotted on points) from two-thirds of costa to two-thirds inner-margin; cilia as forewings. Underside ochreous-pink; markings of upperside more distinctly reproduced; a small purplish blotch on middle of hindmargin of forewings; a similar blotch at apex of hindwing.

One specimen from Duaringa, Queensland; also one in Brisbane Museum without record. This species is allied somewhat to *subustaria*, Walk., but differs in the hindmargin, hindwings, &c.

Monoctenia orthodesma, *n. sp.*

Female, 54 mm. Head, antennæ, palpi, thorax, and abdomen pale-biscuit color; palpi beneath white. Legs pale-pinkish-white. Forewings elongate; costa almost straight, slightly curved at apex; apex acute, hindmargin sinuate beneath apex, thence bowed, oblique; pale-biscuit colour; an almost straight dark-reddish line from costa just before apex to inner-margin at about two-thirds, edged anteriorly throughout with a pale-yellow line; cilia dark-reddish. Hindwings with hindmargin almost straight; cilia, colour, and markings as in forewings; costa broadly snow-white, becoming suffused with pale carmine pink at and around apex.

One specimen, Brisbane, in October. Chaste and elegant; not to be confused with any other described species. The hindwings beneath have a large purplish patch placed as in *vinaria*, to which it is allied.

Monoctenia cycnoptera, *n. sp.*

Male, 40 mm. Head, thorax, and abdomen pale-greyish, somewhat tinged with slate colour; legs grey; antennæ ochreous, pectinations four; palpi greyish-ochreous. Forewings triangular; costa straight, apex acute, hindmargin sinuate beneath apex, thence strongly bowed, oblique; pale slaty-grey, minutely and imperceptibly dusted with blackish; a ferruginous spot on inner-margin at about two-thirds, from which proceeds a faint pale-yellowish streak towards apex; cilia pale-ferruginous. Hindwings with hindmargin rounded, somewhat prominent at apex; snow-white, without markings; cilia white. Forewings beneath with a large blotch of claret colour just below middle of hindmargin.

One specimen received from Mr. A. Zeitz, taken at Lake Mulligan, South Australia. It is a conspicuously distinct species, and is remarkable for the colour of hindwings, all the other species known to me being more or less unicolorus.

MONOCTENIA (?) XANTHASTIS, *n. sp.*

Female, 55 mm. Head, palpi, thorax, and abdomen pale-ochreous-fuscous. Antennæ yellowish, pectinations one. Legs yellowish-brown. Forewings elongate-triangular, strongly dilated posteriorly; costa rather strongly arched, hindmargin rounded, oblique (apex broken); pale-ochreous, finely dusted with light-fuscous; a straight dark-fuscous line from beyond one-fourth of costa to one-third inner-margin; a similar curved-inwards line from three-fourths of costa to two-thirds of inner-margin; a transverse linear discal dot midway between these lines; cilia dark-brown, with a yellow line near base. Hindwings with hindmargin rounded; bright golden orange, markings and cilia as in forewings, but first line and discal dot absent. Forewings beneath bright golden yellow, strongly suffused with dark brown strigulations along costa and hindmargin; discal spot much larger. Hindwings with colour as forewings wholly strigulated with dark brown, more thickly towards base.

One specimen from Mr. R. Illidge, of Bulimba, Queensland, who took it at Gympie in March. It is certainly not referable to the genus *Monoctenia*, but is placed here provisionally, the curious unpectinated antennæ of the female would in itself warrant a new genus being formed, but in the absence of the male I shall place it in *Monoctenia*. The nearest approach to it as regards superficial appearance is *Eumelea rosalia*, Cram.

GEOMETRIDÆ.

EUCHLORIS (IODIS) MICROGYNA, *n. sp.*

Female, 22 mm. Head dull yellowish-green, fillet greenish-glaucous. Antennæ and legs yellowish-white; posterior legs white. Thorax and abdomen dull glaucous-green; abdomen with three minute snow-white crests on middle segments. Forewings elongate-triangular; costa gently arched, hindmargin slightly angulated in middle, upper half straight, lower half oblique; dull-glaucous-green, a darker green discal dot, a hindmarginal row of minute snow-white spots at extremities of veins; cilia greenish. Hindwings with hindmargin angulated on vein four; colour, markings, and cilia as in forewings; cilia lighter towards anal angle. Between *neptunus*, Butl., and *centrophylla*, Meyr.

One specimen, taken by Mr. C. J. Wild at Brisbane (type in Brisbane Museum).

EUCHLORIS GONIOTA, *n. sp.*

Female, 29 mm. Head greenish-white; palpi long, fuscous, apex of second and terminal joints snow-white. Legs and antennæ fuscous, tibiæ and tarsi suffusedly ringed with white, posterior pair white. Thorax bright pea-green; abdomen light-fuscous, beneath snow-white. Forewings elongate-triangular; costa rather strongly arched, especially at base; hindmargin bowed, waved, with a rounded angulation on veins four and five; bright pea-green, with scattered whitish strigulæ; costa brownish throughout (strigulated with whitish) attenuated at extremities; a large roundish pale flesh-colored patch, mixed with fuscous on middle of hindmargin, continued narrowly along hindmargin to apex, edged anteriorly very finely with fuscous or dark-fuscous; a narrow, waved, somewhat interrupted ferruginous line, obsolete towards anal angle; cilia greyish-ochreous or pale flesh-colour on hindmarginal patch, green on posterior half of hindmarginal and round anal angle, with a small spot of same colour at termination of veins. Hindwings with hindmargin strongly waved and angulated, more prominently on veins four and six; colour, markings, and cilia as in forewings, but hindmarginal patch with rounded portion less prominent; a small triangular spot at termination of first vein; cilia round, anal angle snow-white.

One specimen from Mackay, Queensland, taken by Mr. R. E. Turner and presented to the Brisbane Museum, where the type is preserved.

EUCHLORIS ORTHODESMA, *n. sp.*

Male (?), 30 mm. Head green; antennæ white (?), broken; thorax glaucous-green, abdomen glaucous-green, posterior segments whitish, silkly, mixed with yellowish-ferruginous. Legs white, anterior tibiæ and tarsi tinged with fuscous. Forewings elongate-triangular; costa gently arched, apex hardly acute, hindmargin bowed, obliquely rounded; pale iridescent moonlight-blue, extreme costal edge ochreous; a dark-green basal patch, posterior edge nearly straight from one-third costa to one-fourth inner-margin, a broad, dark-green, irregularly-edged, tolerably straight transverse band from three-fourths of costa to three-fourths inner-margin; a darker green discal dot midway between this and basal patch; a rather narrow dark-green hindmarginal fascia, narrower towards anal angle; cilia pale-greenish. Hindwings with hindmargin strongly angulated on vein four; colour cilia, and markings as in forewings, but transverse band broader, especially towards anal angle; hindmarginal fascia not reaching anal angle.

Cairns, Queensland; one specimen, taken in September. This species has a peculiar facies, and reminds one of the Indian forms, to some of which it is doubtless allied.

EUCHLORIS MEGALOPTERA, *n. sp.*

Male, 38 mm. Head and palpi greenish-ochreous, crown and antennæ snow white, antennal pectinations five, ochreous. Legs whitish, anterior pair greenish-tinged. Thorax and abdomen green, sides and apex of abdomen white. Forewings elongate triangular, costa strongly curved at base, thence straight, at apex strongly curved, apex acute, hindmargin gently bowed, oblique; bright yellowish-green; costal edge snow-white throughout, attenuated at extremities; a reddish discal dot just before and above middle of wing; a fine ferruginous hindmarginal line; cilia whitish, terminal half ferruginous. Hindwings with hindmargin strongly angulated on vein four; colour hindmarginal line and cilia as in forewings; a large reddish discal dot centred with ferruginous.

One specimen from North Queensland, without further locality, in collection Brisbane Museum. This species is the largest Australian species known, and is very distinct, but not unlike in shape of wing an *Agathia*.

Tortricina.

TORTRICIDÆ.

DICHELIA COSMOPIS, *n. sp.*

Male, 13 mm. Head, thorax, palpi, legs, antennæ, and abdomen dark-fuscous, legs ringed with dull white, anterior coxæ ochreous. Forewings moderate, elongate, apex obtuse, hindmargin obliquely rounded; dark chocolate, with ochreous-yellow markings; a broad, nearly straight fascia, much broader on inner margin from about one-third of costa to before middle of innermargin, containing traces of transverse lines of ground colour, especially on costa and inner-margin; a small triangular spot on costa at about two-thirds containing a small dot of ground colour; two or three minute dots on costa towards apex, and a few ochreous scales above anal angle; cilia dark-fuscous. Hindwings bright orange, a narrow blackish suffused hindmarginal band tending to be produced along veins; cilia fuscous, with a blackish basal line.

Two specimens received from Mr. G. Lyell, jun., Gisborne, Victoria. This species is very near *lychnota*, Meyr. (of which it may ultimately prove a variety), but differs in the more sharply-defined markings and the triangular costal spot. It is an easily-recognised species.

Pyralidina.

SICULODIDÆ.

STRIGLINA HYALOSPILA, *n. sp.*

Male, 36 mm. Head, palpi, and antennæ greyish-ochreous;

thorax and abdomen reddish-ochreous, anteriorly broadly greyish-ochreous. Legs ochreous-grey. Forewings triangular, costa straight, arched towards apex, hindmargin slightly sinuate above and below middle; yellowish-ochreous, reddish-tinged, reticulated with numerous reddish strigulæ, obscure on basal half of wing, which is dull purplish-fuscous. This colour is continued along to apex, with a projecting tooth at about three-quarters; three transparent iridescent roundish spots in a transverse slightly oblique row, above inner margin at two-thirds, reaching half across wing, and rounded posteriorly by a patch of purplish-fuscous; a purplish-fuscous irregular patch just above middle of hindmargin; cilia yellowish, tinged with reddish-fuscous. Hindwings with hindmargin rounded; colour and cilia as in forewings, but reticulations more intense; a fuscous-purple apical blotch, extending along hindmargin to vein five; a purplish-fuscous transverse fascia from before middle of costa to before middle of inner-margin, contracted above middle, bounded posteriorly by three transverse rounded iridescent spots (transparent) placed in about middle of wing, and anteriorly bounded by two similar spots, longitudinally placed and more suffused; cilia as forewings.

One specimen taken in November at South Barnard Island (Coll. Barnard).

Tineina.

XYLORYCTIDÆ.

Uzucha hypoxantha, *n. sp.*

Female, 35 mm. Head, thorax, antennæ and palpi ashy-grey, abdomen and legs pale yellow, anterior legs somewhat infuscated, basal segment of abdomen with a narrow ferruginous band. Forewings elongate-oblong, costa very strongly and abruptly arched near base, thence tolerably straight, basal third with dense projecting hairs, apex obtuse, hindmargin obliquely rounded; ashy-grey whitish, the latter colour somewhat predominant; a large ill-defined roundish dark-fuscous blotch in middle of wing; cilia ashy-grey whitish, tips paler. Hindwings with hindmargin rounded; pale yellow; apex and hindmargin somewhat suffused with fuscous, most prominent at apex; cilia pale whitish-yellow, with a dark-grey basal line.

One specimen, Coomooboolaroo, Duaringa, Queensland, taken in November (Coll. Barnard), and one specimen taken at Chinchilla, Queensland, in December (in Brisbane Museum Coll.).

The hairs on the costa give the species a curious and distinct appearance; the species is undoubtedly referable to *Uzucha*, although vein 7 of forewing really terminates slightly above the apex.

PILOSTIBES ENCHIDIAS, *Meyr.*

Dr. A. J. Turner, of Brisbane (who generously presented me with a pair), has bred this species from a species of *Eugenia (?)* found a few miles from Brisbane, Queensland. It has hitherto only been recorded from New South Wales.

CRYPTOPHAGA STOCHASTIS, *Meyr.*

I have received specimens from Oakleigh, Victoria, and Herberton, North Queensland. The types were from York, Western Australia.

CRYPTOPHAGA PROLEUCA, *Meyr.*

I have seen specimens taken at Kewell, Victoria.

CRYPTOPHAGA PORPHYRINELLA, *Walke.*

Vide post.

CRYPTOPHAGA ECCLESIASTIS, *Meyr.*

Mr. R. Illidge, of Brisbane, Queensland, has shown me the *male* of this species (which unfortunately got damaged). The colour of all wings is pale sooty-black, with an iridescent purplish sheen. The size is 37 mm. It has hitherto only been recorded from Victoria. Mr. Illidge's specimen was bred from trees growing adjacent to Brisbane.

CRYPTOPHAGA FLAVOLINEATA, *Walk.*

Both Dr. A. J. Turner and Mr. R. Illidge have bred this species from Eucalyptus growing in and around Brisbane. New South Wales is the only previously recorded locality.

CRYPTOPHAGA EPADELPHA, *Meyr.*

Mr. R. Illidge, of Brisbane, has bred this species rather commonly; the female was described by Mr. Meyrick (Trans. Roy. Soc. S.A., p. 36, 1890); the male is somewhat smaller, and differs only in having black hindwings and no hindmarginal spots except on forewings.

CRYPTOPHAGA BALTEATA, *Walk.*

I have seen specimens of this insect from both Sydney and Wimmera district, Victoria; it has not been hitherto recorded but from Mount Lofty, South Australia.

CRYPTOPHAGA STENOLEUCA, *n. sp.*

Male, 40 mm. Head and thorax fuscous; abdomen whitish, with ferruginous segmental rings, second segment broadly orange-red; antennæ and palpi yellowish-white; legs grey-whitish. Forewings moderately oblong, posterior slightly dilated. Costa straight, apex obtuse, hindmargin straight, with a slight sinuation beneath apex; fuscous, finely irrorated with black scales; a

narrow whitish streak along costa from very near base almost to apex, attenuated at extremities ; two very suffused and hardly traceable small dark-fuscous patches in centre of wing ; two from near middle ; cilia dark-fuscous, with a fine whitish line at base. Hindwings with hindmargin somewhat projecting at anal angle ; snow-white, infuscated along hindmargin and apical half of wing ; cilia snow-white, towards apex slightly infuscated.

One specimen, Duaringa, Queensland.

Nearest *irrorata*, Lew., but differs from that species by the white costal streak, besides being a more slender insect.

CRYPTOPHAGA CEPHALOCHRA, *n. sp.*

Female, 45 mm. Head and palpi ochreous-white, basal two-thirds of second joint fuscous externally. Thorax ashy-fuscous, anteriorly whitish-ochreous, edged posteriorly by a fuscous transverse line. Abdomen ochreous-fuscous. Legs dark bronzy-fuscous, posterior femora tinged with ochreous white. Forewings elongate-oblong, costa gently arched, hindmargin sinuate beneath apex, thence straight ; dark-fuscous, mixed with ashy-grey ; veins outlined with fuscous ; a large suffused discal spot in middle of wing. A yellowish hindmarginal streak or line, dotted with fuscous. Cilia ashy-whitish, somewhat barred with fuscous. Hindwings with hindmargin rounded ; dark-fuscous ; 6 and 7 stalked ; a narrow yellowish hindmarginal streak hardly reaching anal angle, broadest at apex ; cilia greyish-fuscous, basal half dark-fuscous, with a fine white basal line.

One specimen taken at electric light (Central Railway Station), Brisbane, Queensland, in January, near the preceding, of which it may prove to be the female.

CRYPTOPHAGA PLATYPEDIMELA, *n. sp.*

Male, 42 mm. Head and palpi ochreous white. Antennæ white, pectinations yellow. Abdomen and legs ochreous-yellow, anterior tibiæ and tarsi fuscous. Thorax ochreous-white, with a large purplish-fuscous median blotch ; patagia ochreous, with a purplish-fuscous patch. Forewings elongate-oblong. Costa nearly straight, hindmargin obliquely rounded ; 2 from near middle ochreous white, sparsely strigulated with faint transverse purplish striga, a purplish-fuscous broad basal patch, its outer edge straight from one-sixth costa to one-sixth inner-margin, leaving a patch of ground-colour at extreme base ; a large purplish-ferruginous discal spot beyond middle ; a narrow irregularly dentate hind-marginal fascia broadest at apex ; cilia dark-fuscous, with a well-defined whitish basal line. Hindwings with hindmargin rounded ; 6 and 7 from a point ; pale yellow ; cilia pale yellow.

One specimen received Mr. R. E. Turner, Mackay, Queensland. It is a pretty and distinct species in the group of *albicosta*, Lew.

CRYPTOPHAGA LURIDA, *Meyr.*, var. ASEMANTA, *Lower.*

Differs from the typical form in being without discal spots of forewings, otherwise precisely similar.

Three specimens from Sydney, N.S.W. (Coll. Melbourne Museum).

CRYPTOPHAGA MONOLEUCA, *n. sp.*

Female, 36 mm. Head, thorax, antennæ whitish, tinged with dull-purplish (palpi broken). Legs fuscous-whitish, abdomen whitish-ochreous. Forewings elongate, costa gently arched, apex hardly pointed, hindmargin rounded; dull chocolate, darker towards costa; a large quadrate white spot in disc, just before middle, preceded by a smaller obscure white spot; cilia whitish, towards base mixed with chocolate, especially at anal angle. Hindwings with hindmargin slightly sinuate beneath apex, thence rounded; greyish-fuscous, lighter towards base; cilia light greyish-fuscous, with a darker line near base.

One specimen from New South Wales (the precise locality not known) bred in February (Coll. Kershaw).

LICHENAULA UNDULATELLA, *Walk.*

Mr. R. Illidge has bred this species from pupæ taken near Brisbane. I have also taken two specimens at Mackay, Queensland, in November. Sydney, N.S. Wales, is the only previously recorded locality.

XYLORYCTA PORPHYRINELLA, *Walk.*

Cryptolechia porphyrinella, Walk., 771; *Cryptophaga porphyrinella*, Meyr., T. Roy. Soc., S.A., p. 32, 1890; *Lithosia bisecta*, Lucas.

Mr. R. Illidge having bred males of this species I am enabled to make the above correction. Meyrick was led into placing it in *Cryptophaga* through only possessing a female. Dr. Lucas has made the astonishing error of describing it as a new *Lithosia.*

XYLORYCTA EPIGRAMMA, *Meyr.*

Cryptophaga epigramma, Meyr., Tr. Roy. Soc., S.A., p. 31, 1890.

Mr. R. Illidge having bred the male of this species, I am able to place it in the correct genus. The Brisbane Museum possesses a curious and well-marked variety, posterior two-thirds of forewing occupied by a large white patch, which, however, does not reach the inner margin.

The specimen was taken at Albion, near Brisbane, in December.

XYLORYCTA HOMOLEUCA, *n. sp.*

Male, 31 mm. Head, palpi, antennæ, thorax, and abdomen

white; very faintly tinged with ochreous, abdominal segments edged with dull-reddish, hardly perceptible. Legs light-fuscous. Forewings moderate, elongate; costa gently arched, apex obtuse, hindmargin obliquely rounded; shining white, faintly ochreous-tinged, without markings; cilia shining snow-white. Hindwings pale-grey; cilia as in forewings. Between *orectis*, Meyr., and *leucophanes*, Lower. From the former it differs in absence of orange costal edge, &c.; and from the latter by the absence of blackish costal edge, color of hindwings, and shape of forewings. The faint ochreous tinge is not very noticeable; veins four and five of the forewings are very closely approximated at base; the neuration is otherwise normal.

One specimen, "Coomooboolaroo," Queensland (Coll. Barnard).

XYLORYCTA SIGMOPHORA, *n. sp.*

Male, 35 mm. Head and thorax ashy-grey whitish; palpi, legs, abdomen, and antennæ same colour, antennal ciliations one and a half; abdomen with ferruginous segmental rings, anterior tibiæ and tarsi fuscous ringed and whitish; terminal joint of palpi infuscated. Forewings elongate-oblong, costa slightly arched, apex obtuse, hindmargin obliquely rounded; ashy-grey whitish, minutely irrorated with black; an obscure patch of blackish scales towards base; a blackish ∞-shaped mark in middle of wing, followed by a small blackish suffusion; a hindmarginal row of confluent blackish dots, immediately followed by a whitish line on extreme hindmargin; cilia ashy-grey whitish, with a darker median line. Hindwings light fuscous; cilia grey-whitish, with a fuscous basal line.

Very like in general appearance species of *Agriophara*. It is not near any other known to me.

TELECRATES HELIOMACULA, *n. sp.*

Male, 27 mm. Head, palpi, and thorax yellow; anterior half of thorax dark purplish-fuscous; abdomen yellowish-orange, segmental margins broadly fuscous-purple, anal tuft orange. Legs yellow, anterior and posterior tibiæ and tarsi fuscous, middle femora infuscated. Antennæ fuscous, ciliations one-half. Forewings elongate-oblong, costa slightly arched at base, thence straight, apex rounded; hindmargin obliquely rounded; dark-fuscous, purple shining; markings yellow; an elongate spot immediately beneath costa at one-third; an irregular quadrate spot immediately beneath on inner margin before middle; a large irregular ovate spot just before apex, beneath which is a smaller spot suffused with three or four lines of ground colour; cilia dark-fuscous, with a darker basal line and a fine ochreous hindmarginal line. Hindwings orange-yellow; a narrow fuscous hindmarginal band, broadest at anal angle; cilia as in forewings.

One specimen, Brisbane (Type in Brisbane Museum, Queensland). A very chaste and distinct species.

AGRIOPHARA CREMNOPIS, *n. sp.*

Male, 26 mm. Head and thorax black, abdomen fuscous-grey, antennæ blackish, ciliations grey, three. Legs grey, suffused somewhat with fuscous; all tibiæ and tarsi fuscous, tarsi with whitish apical rings. Forewings elongate, costa moderately arched, apex rounded, hindmargin obliquely rounded; black, with two fine irregular, hardly perceptible, blacker lines, anteriorly edged with a few whitish scales; a row of black dots from below middle of costa, continued in a curve round to anal angle, anterior three edged anteriorly somewhat with whitish; a row of very small whitish dots on costa from middle to middle of hindmargin, obscured on hindmargin; cilia blackish-fuscous, with a few whitish points. Hindwings grey, suffused with pale fuscous posteriorly; cilia greyish.

Distinct by the black forewings. The markings are obscure unles examined in a side light.

One specimen, Duaringa, Queensland (Coll. Barnard).

ŒCOPHORIDÆ.

PALPARIA CALLIMORPHA, *n. sp.*

Male, 40 mm. Head, legs, antennæ, and thorax orange-yellow; palpi very long, ochreous-whitish, terminal joint fuscous, second joint with long hairs. Abdomen golden-fuscous. Forewings elongate-oblong, costa strongly arched; rosy carmine; extreme costal edge orange-yellow; a darker narrow carmine streak along fold from base to beyond middle; a fuscous-carmine discal spot, beyond which is a moderately broad blackish band-like suffusion curved to middle of inner margin at two-thirds. Space beyond this to hindmargin orange-yellow, except on costa; cilia orange mixed with fuscous (imperfect). Hindwings with hindmargin rounded; golden orange-yellow, cilia golden-yellow.

A fine and handsome species, closely allied to *lambertella*, Wing. I at first thought this might prove to be a variety of the last-mentioned, but in a long series (bred by Mr. G. Lyell. jun., of Gisborne, Victoria) I can find no specimen like it.

The one specimen known was taken at Cairns, Queensland, in September.

HOPLITICA EUGRAMMA, *n. sp.*

Male, 20 mm. Head and antennæ pinkish-grey, antennæ annulated with fuscous. Palpi pinkish, second joint white, apex grey. Abdomen bronzy, segmental margins yellowish-ochreous. Thorax pinkish-fuscous. Legs white, anterior tibiæ and tarsi

carmine tinged, posterior pair and middle tibiæ and tarsi ochreous-yellowish. Forewings oblong, moderately broad. Costa arched towards base, apex obtuse, hindmargin obliquely rounded ; flesh colour, minutely irrorated with deep pink scales, giving the appearance of being wholly pink ; costal edge crimson throughout ; extreme costal edge towards base whitish ; a hardly perceptible minute blackish dot in disc before middle ; a large very distinct blackish dot in disc at two-thirds ; a roundish dark-fuscous suffusion on inner-margin at one-third ; a similar spot, but more than twice as large as last, on inner-margin just before anal angle ; a narrow hindmarginal streak, suffused and not reaching anal angle ; cilia whitish-grey, mixed with pink, especially towards base. Hindwings light yellow ; cilia greyish, becoming fuscous around apical half and anal angle.

One specimen, Duaringa, Queensland (Coll. Barnard), taken in September.

The large black spot on forewings is a well-marked character. In the present species vein of the forewings hardly terminates in the apex. Correctly speaking it is immediately below ; therefore seemingly a *Helio causta*. The balance, however, is in favour of referring it to *Hoplitica*.

EOCHROIS POLYDESMA, *n. sp.*

Female, 25 mm. Head and palpi whitish, second joint of palpi externally fuscous. Legs whitish, tibiæ and tarsi somewhat infuscated. Thorax fuscous-whitish ; antennæ fuscous. Forewings moderately broad. Costa gently arched, apex rounded, hindmargin almost straight ; ashy-grey, irrorated with white and reddish-brown markings ; a small ferruginous basal spot, anterior edge somewhat suffused, posterior edge darker and well defined, angulated above and below middle ; a second similar but narrower fascia from costa near beyond this and parallel to it ; a small irregular triangular spot of ground-colour on costa at two-thirds edged with white ; immediately below this are two reddish-brown spots, one on each side ; another similar above inner-margin at two-thirds, the three forming a triangle ; a broad bright ferruginous fascia from before five-sixths costa attenuated to anal angle, anteriorly suffused with yellowish, posteriorly well defined, indented beneath costa and followed by a fine line of ground-colour ; apical and hindmarginal area beyond this yellowish-ferruginous ; an erect linear white streak immediately before anal angle, reaching about one-third across wing, edged anteriorly by a patch of darker ground-colour ; cilia white mixed with greyish, at base tinged with ferruginous. Hindwings dark-fuscous ; cilia fuscous, with a darker line near base. Wings beneath dark-fuscous. Forewings with a common costal streak from near base to near apex, broadest in middle.

Type in National Museum, Melbourne, Victoria. The specimen was taken in New South Wales, probably near Sydney.

The markings of this species are as intricate as they are elaborate.

ZONOPETALA (?) ZYGOPHORA, *n. sp.*

Female, 15-18 mm. Head snow-white. Palpi snow-white; basal half of second joint fuscous, tinged externally. Antennæ and thorax dark-coppery-fuscous. Legs ochreous-yellow, slightly infuscated. Abdomen ochreous-fuscous. Forewings moderate; costa gently arched; apex round-pointed; hindmargin obliquely rounded, snow-white; a dark-fuscous basal patch just reaching inner-margin; a broad, reddish-fuscous fascia; anterior edge curved inwards, posterior edge straight from middle of costa to middle of inner-margin; a moderate reddish-fuscous (blackish at apex) hindmarginal fascia from apex to anal angle, from lower extremity of which proceeds a reddish-fuscous tooth to middle of median fascia; the ground colour between the last two fascia is tinged with yellow on costa; cilia yellow, mixed with fuscous, and with a darker parting line. Hindwings yellow, tinged with fuscous; cilia greyish-ochreous.

Two specimens Duaringa, Queensland, taken in January and February.

Nearest *decisana*, Walk., but markings less complex; the shape of wing is somewhat different from the other species.

EULECHRIA CEPHALOCHRYSA, *n. sp.*

Female, 23 mm. Head, palpi, and legs orange. Abdomen greyish-ochreous. Thorax shining snow-white. Forewings moderately elongate, rather narrow; costa slightly arched, apex somewhat pointed; hindmargin obliquely rounded, white, markings ochreous-fuscous; costal edge dull-orange throughout, except at base, which is fuscous; a spot on fold at one-fifth from base, another obliquely beyond, and slightly below it, suffusedly connected with a somewhat curved streak in middle of wing to two-thirds where it forms a sharp semicircular streak to anal angle; a suffused spot on apex; a narrow, suffused line along hindmargin; cilia ochreous-whitish, becoming greyish at apex and anal angle. Hindwings grey; cilia pale-yellowish.

One specimen Duaringa, Queensland (Coll. Barnard), taken in May.

Somewhat like a *Philobata*, being in form of wing like the male "*productella*," Walk. This, the present species, is referable to the *elæota* group.

SPHYRELATA DICHROA, *n. sp.*

Male, 13 mm. Female, 15 mm. Head and palpi snow-white;

basal two-thirds of second joint of palpi golden-brown externally. Antennæ fuscous; basal joint white. Legs dark-fuscous, posterior pair ochreous-yellowish. Abdomen greyish-ochreous. Thorax golden-ochreous, posteriorly with a white spot. Forewings moderate; costa arched, apex round-pointed; hindmargin obliquely rounded, snow-white, markings golden-ochreous; a narrow basal spot, not reaching inner-margin; a broad, slightly-curved fascia dilated on inner-margin from before middle of costa to before middle of inner-margin; a strongly curved fascia from two-thirds of costa to anal angle; a similar fascia from just before apex, confluent at anal angle with previous streak, leaving a triangular spot of ground-colour on costa; a hindmarginal row of six or seven minute fuscous dots; cilia whitish, middle third yellowish, at anal angle with a fuscous tooth. Hindwings grey; cilia grey, ochreous-tinged at base towards apex.

One specimen, Duaringa, Queensland (Coll. Barnard), taken in May.

PILOPREPES LOPHOPTERA, *n. sp.*

Male, 21 mm. Head, thorax, and palpi white; second joint of palpi internally and externally fuscous-tinged. Legs and abdomen pale yellow, anterior legs pearly white, slightly infuscated. Antennæ fuscous. Forewings elongate, broadly dilated. Costa strongly arched, especially on basal half; apex rounded; hindmargin strongly rounded, white; a large patch of olive-green extending from base to near middle, posterior edge slightly curved from beyond one-third of costa to half of inner-margin, in the blotch are contained a suffused irregular patch of white, a narrow dentate milky-blue line proceeding from the white patch to inner-margin, and a small white basal spot; a suffused fuscous discal spot; a curved pale leaden fascia from middle of costa to above anal angle, anterior edge very suffused, posterior well defined, with an indentation in middle; a deep leaden patch near middle of hindmargin, hardly cut by veins of ground-colour; a smaller lighter spot above this; a leaden line along hind-margin and apical fourth of costa; cilia snow-white. Hindwings pale-yellow; cilia whitish ochreous.

One specimen beaten from *Eugenia myrtifolia* at Kedron Brook, near Brisbane, Queensland, in October. Intermediate in form between *anassa*, Meyrick, and *aristocratica*, Meyrick.

TRACHYPEPLA CALLIDESMA, *n. sp.*

Male, 17; female, 19 mm. Head and palpi white, palpi mixed with fuscous externally, especially at apex of basal joint. Antennæ fuscous, annulated with dark-fuscous, ciliations one and a-half. Legs fuscous, posterior pair grey-whitish. Abdomen yellowish-ochreous; thorax grey-whitish. Forewings moderate.

Costa gently arched, apex round pointed, hindmargin obliquely rounded; greyish-ochreous, suffusedly irrrorated with dark-fuscous, some white scales towards base mixed with black, two tufts of ochreous scales placed one above the other at one-third from base, edged on upper portion by a blackish streak; two black dots, longitudinally placed in middle of wing, separated by three small snow-white dots; immediately above the posterior white dot is an ochreous spot, finely edged with black, and below this is a large tuft of scales, snow-white anteriorly and yellowish posteriorly; a strongly-curved black line almost from black-edged spot to anal angle; an irregular black suffused apical patch; three small white dots below this on hindmargin; cilia greyish-ochreous, with a suffused black median line not reaching anal angle. Hindwings ochreous-grey, at base lighter; cilia greyish ochreous.

Two specimens taken in January by Mr. G. Barnard at Win dermere, Tasmania. The second Australian species, easily known from *melanoptila*, Mey., by the white head, and tufts not being black, &c.

PHILOBOTA ISOSCELIPHORA, *n. sp.*

Male and female, 25 mm. Head deep yellow. Thorax and antennæ purple-fuscous, palpi fuscous, termimal joint yellowish. Legs pale-yellowish, anterior pair fuscous; abdomen yellowish, sometimes dark-fuscous. Forewings elongate moderate, costa gently arched, apex rounded, hindmargin slightly sinuate, oblique; bright yellow; markings dark purple-fuscous; a narrow basal fascia, curved outwards and continued to one-fourth along costa; an erect triangular patch on inner-margin near anal angle reaching nearly half across wing; a moderate fascia along hind-margin anteriorly curved outwards; cilia dark-fuscous. Hind-wings dark bronze-fuscous, paler towards base; cilia dark-fuscous.

Two specimens, Duaringa, Queensland, in October. Allied to *fascialis*, Fab., of which it may ultimately prove a variety.

PELTOPHORA PSAMMOCHROA, *n. sp.*

Male, 34 mm. Head, thorax, palpi, and antennæ greyish-ochreous; palpi long, thorax narrowly dark fuscous anteriorly, second joint of palpi fuscous towards apex, apical half of terminal joint whitish. Antennal ciliations three, abdomen greyish-ochreous, mixed with rufous on base of segments. Legs greyish-ochreous, anterior pair infuscated, tibiæ and tarsi fuscous with whitish apical rings. Forewings elongate, dilated posteriorly; costa gently arched, hindmargin obliquely rounded; greyish-ochreous, with minute scattered blackish scales; a black streak along basal one-eighth of costa; a similar streak along basal one sixth of inner margin, and a black dot between, the three form-

ing a disconnected fascia ; a black dot in the disc at about one-third, another slightly beyond and below on fold ; a third beyond the first ; a curved mark in disc at two-thirds, sometimes divided into three dots ; a transverse curved line from five-sixths of costa to anal angle, indented beneath costa, a hindmarginal row of black dots ; cilia greyish fuscous. Hindwings fuscous-grey ; cilia grey-whitish, mixed with fuscous scales.

Allied to "*privatella*," Walk., but separable by darker ground-colour, markings at base, and hindmarginal dots.

Two specimens, Duaringa, and two Brisbane, Qneensland, in December.

PELTOPHORA PANXANTHA, *n. sp.*

Female, 25 mm. Head and palpi yellow. Thorax yellow, anterior half and shoulders deep purple. Terminal joint of palpi and second joint externally fuscous. Antennæ yellowish ; basal joint fuscous-purple. Legs pale yellowish-white. Forewings moderate ; costa gently arched ; hindmargin obliquely rounded ; deep-yellow, deepest posteriorly ; a minute purplish spot at base of costa ; cilia yellow. Hindwings light fuscous ; cilia grey-whitish, with a darker basal line.

Coomooboolaroo Ranges. Duaringa, Queensland, in October.

Its nearest ally is "*coniortia*," Meyr., but it is easily separated from that species by the thorax, &c.

PELTOPHORA HOLOCYCLA, *n. sp.*

Female, 24 mm. Head and abdomen yellow. Palpi ochreous-yellow ; basal two-thirds of second joint externally tinged with fuscous. Thorax dull purplish-fuscous, with a white, quadrate central spot. Legs ochreous-yellow, anterior pair infuscated. Antennæ fuscous. Forewings elongate, moderately broad ; costa gently arched, apex rounded ; hindmargin obliquely rounded, snow-white, slightly shining ; markings dark-fuscous, a narrow spot in middle of wing at one-sixth from base ; a straight, moderate fascia, running obliquely from one-third of costa to one-half inner-margin ; a large circular ring (somewhat elliptical) above anal, and connected with costa by a short wedge-shaped spot at three-fourths ; a curved, narrow fascia along upper two-thirds of hindmargin ; cilia whitish, tinged with yellow, especially round anal angle. Hindwings pale-ochreous ; cilia ochreous-yellow, darker at base.

Allied to *mychias*, Meyr., but quite different in markings.

One specimen, Stawell, Victoria, from Mr. F. Spry.

PELTOPHORA EUGRAMMA, *n. sp.*

Male, 25 mm. Head ochreous-white. Palpi, thorax, legs, and antennæ dark-fuscous, posterior legs and palpi externally ochreous.

antennal ciliations 5. Abdomen ochreous. Forewings elongate, dilated posteriorly, costa gently arched, apex round-pointed, hindmargin obliquely rounded; pale whitish-ochreous; a thick blackish streak along costa from base to middle, attenuated posteriorly; a nearly straight, irregularly edged blackish fascia from posterior end of costal streak to inner-margin before middle, thicker on lower half; a thick curved blackish fascia from five-sixths of costa to anal angle, projecting inwards above middle, from which projection proceeds a semicircular thick tooth, narrowed above and ending above anal angle; a dentate moderately thick blackish hindmarginal line, joining last-mentioned fascia on costa and anal angle, space between as ground-colour, separated by fine lines of a blackish colour on lower half; cilia yellow, at and below apex dark-fuscous. Hindwings bright yellow; apex suffused with fuscous; cilia yellow, round apex fuscous.

One specimen from Springvale, Victoria. Exceptionally distinct and handsome.

PLEUROTA STENODESMA, *n. sp.*

Female, 16 mm. Head, thorax, palpi, antennæ and legs ashy-grey whitish, basal joint of antennæ and second joint of palpi internally and laterally fuscous. Abdomen greyish. Forewings elongate, dilated posteriorly, costa gently arched, apex rounded, hindmargin oblique; ashy-grey whitish; all veins finely and neatly outlined in blackish; a fine blackish line from base above middle to end of cell; a more distinct similar line from base along fold to beyond two-thirds; space above this clear white, continued to hindmargin below apex, but cut by a fine line of black beyond end of cell; cilia ashy-grey whitish. Hindwings and cilia greyish, cilia with a darker line at base.

One specimen taken at Highbury, South Australia, in December. The markings of this species are not unlike that of *Semnoceros crambella*, one of the *Depressariadæ*.

CÆSYRA EUCHRYSA, *n. sp.*

Male, 15 mm; female, 17 mm. Head yellow, palpi and antennæ pale-yellow, palpi externally fuscous, antennæ annulated with fuscous. Legs fuscous, posterior pair ochreous-yellowish, abdomen greyish-fuscous; thorax purple-fuscous. Forewings elongate, moderate, costa gently arched, hindmargin oblique, slightly sinuate beneath apex; bright yellow; a dark-fuscous narrow basal patch reaching both margins, shortly continued along costa; a bright reddish-purple hindmarginal band, bounded by a blackish sinuate line from four-fifths costa to before three-fourths inner-margin; in one specimen the band contains a yellow spot of ground-colour and four small spots of same colour along hindmargin, and sometimes the median portion of the band is

suffused ochreous or ochreous-fuscous patches; cilia purplish-fuscous. Hindwings bronzy-grey, somewhat ochreous-tinged; cilia greyish-ochreous, with an indistinct darker line. Near *paracycla*, Mey., and *concisella*, Walk., but it differs from the latter in having the thorax wholly black and basal fascia, and from the former by thorax and shape of wing. It is not unlike *Chrysoryctis xystidophora*, Meyr. (Tineidæ).

Two specimens, Duaringa, Queensland, in September and December.

Cæsyra heliophanes, *n. sp.*

Male, 17 mm. Head and palpi yellow, second joint of palpi infuscated externally, except towards apex. Thorax, shoulders and abdomen dark purple-fuscous, antennæ fuscous, ciliations nearly 2, abdomen yellow beneath. Legs dark-fuscous, post pair yellowish. Forewings moderate, costa gently arched, apex rounded, hindmargin obliquely rounded; shining deep yellow, with purple-fuscous markings; a basal patch from costa to inner-margin, continued along costa to one-half, attenuated posteriorly; a broad hindmarginal band, occupying more than apical third of wing, from costa at about two-thirds to inner-margin before one-third. Cilia blackish-fuscous, purplish tinged. Hindwings and cilia bronzy-fuscous, becoming fuscous round apex.

Two specimens, Duaringa, Queensland, in August (Coll. Barnard).

Cæsyra opsiphanes, *n. sp.*

Male, 18 mm. Head and palpi yellow. Thorax and abdomen purplish-fuscous. Legs fuscous, posterior pair ochreous-yellowish, anterior and middle pair with yellowish tarsal rings; antennæ fuscous. Ciliations $1\frac{1}{2}$. Forewings moderate; costa gently arched; apex rounded, hindmargin obliquely rounded; deep shining yellow, markings fuscous-purple, in some lights shining purple; a narrow basal fascia reaching both margins, continued along costa to beyond half, attenuated posteriorly; a broad hindmarginal band from two-thirds costa to beyond inner-margin, and containing two wedgeshaped spots of ground-colour, one on costa and one on inner-margin, which is suffused; cilia dark-fuscous, with a few yellow points. Hindwings and cilia dark bronzy-fuscous; cilia yellowish at base. Allied to the two preceding. The purple is very resplendent in some lights.

Two specimens at Duaringa, Queensland, in February.

Cæsyra heterozona, *n. sp.*

Male, 13; female, 15 mm. Head and palpi deep yellow, basal half of second joint purplish-fuscous. Legs fuscous, posterior pair yellowish-ochreous. Thorax deep purple-fuscous, collar narrowly yellow, abdomen and antennæ fuscous. Antennal ciliations 1.

Forewings moderate, dilated posteriorly; costa somewhat arched, apex rounded, hindmargin obliquely rounded; deep yellow, markings fuscous-purple; a narrow basal fascia; a strongly curved (in some specimens nearly straight), rather thick transverse fascia from two-thirds of costa to anal angle, continued narrowly along costa to apex; cilia yellow, in some specimens tinged with fuscous. Hindwings and cilia light greyish-fuscous, cilia becoming ochreous at apex, and with an indistinct fuscous line. In the "*ocellaris*" group; it resembles very much *Brachynemata cingulata*, Mey., but is larger, and the antennæ are different.

Five specimens (Coll. Barnard) taken near Duaringa, Queensland, in September.

Cæsyra ochrochoa, *n. sp.*

Male and female, 17 mm. Head, thorax, and palpi light yellow, slightly shining; palpi whitish internally, slightly fuscous externally. Antennæ, abdomen, and legs fuscous; posterior legs whitish. Forewings elongate, dilated posteriorly; costa gently arched, apex rounded, hindmargin obliquely rounded; shining yellow, costal edge towards base blackish; a very indistinct light fuscous spot above anal angle; cilia pale yellow. Hindwings light-fuscous; cilia light-grey, with a darker basal line.

Three specimens from Gisborne, Victoria, sent by Mr. G. Lyell, jun., taken in October.

Ocystola oxyptera, *n. sp.*

Male, 17 mm. Head and thorax yellow, posterior half of thorax purplish-fuscous, shoulders purplish; abdomen, antennæ, and legs dark-fuscous; antennal ciliations 1½; palpi fuscous, internally yellowish. Forewings elongate, moderate; costa gently arched, apex acute, hindmargin sinuate beneath apex, thence obliquely rounded; deep golden yellow; a narrow blackish costal streak from base, where it expands into a spot to fascia; a purplish fuscous hindmarginal band occupying apical half of wing, anteriorly edged by a dentate black line from before three-fifths costa to middle of inner-margin; cilia reddish-ochreous, at apex and round anal angle blackish. Hindwings and cilia blackish.

One specimen from Stawell, Victoria, bred from a portable case found on *Templetonia retusa* in December.

Guestia peladelpha, *n. sp.*

Male and female, 25 mm. Head, thorax, palpi, and antennæ brownish-ochreous, palpi externally grey. Legs light-fuscous, tibiæ ringed suffusedly with white, posterior legs greyish-ochreous; abdomen greyish-ochreous. Forewings elongate-oblong, dilated posteriorly; dull brownish-ochreous; a black, well

defined streak from base along fold to one-fourth; a narrow linear black mark above and beyond this; a small blackish suffused mark at end of cell; a hindmarginal row of blackish dots continued along apical fourth of costa, preceded by a similar but very faint row of dots; cilia pinkish-ochreous. Hindwings and cilia grey.

Three specimens taken in July at Parkside, South Australia.

It is essentially a winter species, being taken only in July, and then rarely. I have captured three species in as many years, usually at light.

ŒCOPHORA PENTOCHRA, *n. sp.*

Female, 10 mm. Head and palpi ochreous-white; second joint fuscous at base. Antennæ and legs dark-fuscous. Tibiæ and tarsi ringed with whitish. Abdomen greyish. Forewings blackish-fuscous, with ochreous-white markings; a small spot at base of wing; a broad fascia from one-fourth of costa to one-fourth inner margin, edges irregular; a similar fascia, more oblique, from one-half of costa to before anal angle; two quadrate spots, one at costa at three-quarters, and one on inner margin obliquely below. A similar spot on costa at apex. Cilia ochreous-whitish, at base blackish-tinged. Hindwings and cilia grey-whitish, tinged with fuscous at apex.

One specimen at Eucla, West Australia, in December.

MACROBATHRA MICROPIS, *n. sp.*

Male, 19; female, 21 mm. Head whitish-ochreous. Antennæ and palpi blackish; basal two thirds of second joint of palpi whitish-ochreous. Thorax whitish-ochreous, suffused with fuscous, anterior half black. Legs blackish, banded with white. Abdomen fuscous. Forewings elongate-lanceolate, black, markings whitish-ochreous; a moderate fascia, suffused with fuscous from one-fifth costa to one-third inner margin, much dilated on inner margin, constricted in middle; a roundish spot on middle of costa, and one opposite on inner margin, suffused with fuscous, and ill-defined; a sub-quadrate spot (larger than that on middle of costa) on costa at four-fifths; a small spot on anal angle; cilia blackish, on costal spot ochreous-white, on anal angle whitish-ochreous. Hindwings bronzy-fuscous; cilia grey, darker at apex. A neatly-marked species, somewhat like "*ceraunobola*," Mey.

Two specimens Coomooboolaroo Range, Duaringa, Queensland (Coll. Barnard).

MACROBATHRA HETEROCERA, *n. sp.*

Female, 19 mm. Head and palpi ochreous-white; base of second joint and apex of terminal fuscous externally. Antennæ dark-fuscous. Legs dark-fuscous, suffusedly banded with whitish-

ochreous. Abdomen yellowish-ochreous. Thorax dark purple-fuscous, suffused with whitish. Forewings elongate-lanceolate, shining dark bronzy-fuscous ; markings white ; a moderate fascia from one-fifth costa to one-fourth inner-margin, but not nearly reaching it, posterior edge with a small indentation above ; a narrower fascia from middle of costa to middle of inner-margin, but not reaching it, narrowed on costa and towards inner-margin, and with an indentation on each side, giving the appearance roughly of a figure 8 ; a wedge-shaped spot on costa about three-fifths, and a smaller round one on anal angle ; cilia dark-fuscous, with a white, wedge-shaped spot at apex, and a small, whitish spot at anal angle. Hindwings light-fuscous, with a white, wedge-shaped spot at apex, and a small, whitish spot at anal angle. Hindwings light-fuscous ; cilia greyish-fuscous.

Not very near any other. The whitish head is very conspicuous ; the second fascia is, no doubt, formed by the confluence of the two median spots. In other specimens they may separate, for which allowance should be made.

One specimen taken at " Billopp," Tasmania, by Mr. G. Barnard in December.

Macrobathra dasyplaca, *n. sp.*

Male, 17 mm. Head fuscous, mixed with whitish ; palpi yellow-ochreous, terminal joint externally infuscated. Antennæ and abdomen fuscous, antennæ finely annulated with yellowish. Legs fuscous, posterior pair yellowish-ochreous. Thorax yellowish-ochreous, with a large, fuscous anterior, quadrate spot. Forewings elongate-lanceolate, yellow ; a moderate blackish basal fascia, posterior edge curved inwards ; an irregular, blackish suffusion along inner margin, continued suffusedly to anal angle, anterior edge almost touching base of fascia ; from anterior portion of this fascia proceeds a fine line, which gradually expands along dorsal portion of wing until it forms an elongate diamond-shaped patch, posterior portion touching middle of hindmargin, and leaving costa clear throughout, except basal fascia ; cilia yellowish, mixed with grey, beneath anal angle yellow. Hindwings dark-fuscous ; costal cilia yellow, remainder greyish-fuscous.

Rather an abnormal-looking species as regards markings. Between "*euryxantha*," Meyr., and " *Chrysotoxa*," Meyr.

One specimen taken in March at Windermere, Tasmania, by Mr. G. Barnard.

Macrobathra asemanta, *n. sp.*

Female, 20 mm. Head, abdomen, and palpi pale yellowish-ochreous; terminal joint fuscous, antennæ fuscous, annulated with yellow. Thorax yellowish-ochreous, with an anterior quadrate

fuscous patch. Legs fuscous, tibiæ and tarsi banded with yellowish, posterior pair yellowish-ochreous. Forewings elongate-lanceolate; pale yellowish-ochreous, markings dull fuscous-purplish, a small spot on base of costa; a moderately broad fascia, anteriorly edged with blackish, from about three-fourths of costa to just before anal angle, anterior edge with a slight indentation, posterior edge straight and dilated on inner margin, central portion paler; a narrow wedgeshaped hindmarginal band, not touching fascia, enclosed space as ground-colour; cilia fuscous, on middle of hindmargin yellowish. Hindwings bronzy-fuscous, cilia fuscous, paler towards base.

One specimen, Windermere, Tasmania, in January, taken by Mr. Geo. Barnard. This species is not unlike a *Cæsyra*. The absence of the first fascia, which is only represented by a dot, is a well-marked character.

MACROBATHRA GONOLOMA, *n. sp.*

Male, 17 mm. Head dark-fuscous, palpi, abdomen, and thorax yellow; terminal joint of palpi fuscous-tinged, thorax with a narrow collar of purplish-fuscous, antennæ fuscous annulated with yellow. Legs dark-fuscous, tibiæ and tarsi suffusedly banded with yellow, posterior legs yellowish-ochreous. Forewings elongate-lanceolate, yellow; a broad purple-blackish basal patch, posterior edge curved outwards from one-sixth of costa to one-sixth inner-margin, apical two-fifths of wing occupied by a patch of reddish-fuscous, anterior edge somewhat blackish, curved inwards on upper half and outwards on lower half; cilia greyish-fuscous, at anal angle yellowish tinged. Hindwings dark-fuscous, becoming blackish towards base; cilia greyish, becoming yellow at base and on costa. Nearest "*euryxantha*," Meyr., but the shape and arrangement of the fascia and band are conspicuously distinct.

Two specimens, Duaringa, Queensland, in April (Coll. Barnard).

MACROBATHRA DIPLOCHRYSA, *n. sp.*

Female, 16 mm. Head, palpi, thorax, antennæ, and legs blackish-fuscous, tip of terminal joint of palpi ochreous-white, second joint roughened with scales, tibiæ and tarsi ringed with ochreous-whitish, abdomen ochreous, mixed with black. Forewings elongate, moderately broad, apex somewhat pointed, blackish-fuscous; a broad black fascia from one-third costa to one-third inner margin, broadest on costa, and edged anteriorly by its equal width of reddish-brown; a small reddish spot on middle of inner-margin, edged above with black, and surmounted on costa by an ochreous white dot; a larger ochreous white dot on costa at three-fourths, and a smaller one beneath on anal angle, both irregularly edged with black; cilia blackish-fuscous.

Hindwings dark-fuscous, becoming ochreous at base ; cilia dark-fuscous, at base ochreous.

Five specimens received from Mr. R. Illidge, taken at Brisbane, Queensland. It is near *ceraunobola*, Meyr.

GLYPHIPTERYGIDÆ.

Eupselia holoxantha, *n. sp.*

Male, 15 mm. Head, palpi, legs and antennæ fuscous. Thorax silver-grey, broadly dark-fuscous posteriorly, patagia silver-grey. Forewings with costa nearly straight, apex round-pointed, hindmargin slightly sinuate beneath apex ; silver-grey, with a few fine obscure strigulæ ; a dark chocolate triangular patch on inner-margin at one-third reaching more than half across wing, anterior edge well defined, posterior somewhat suffused ; a large suffused chocolate patch, occupying apical third of wing ; a suffused spot of chocolate at apex, separated from preceding by a suffused line of ground-colour ; a snow-white discal spot on anterior edge of large apical patch ; cilia chocolate, with three darker lines. Hindwings light-yellow ; hindmargin narrowly blackish ; cilia blackish.

One specimen, Parkside, South Australia, on a fence during a high wind. Differs from the other described species by the narrow hindmarginal line of hindwings, besides other points.

GELECHIADÆ.

Gelechia strophiopeda, *n. sp.*

Male, 11 mm. Head, palpi and thorax ochreous, palpi tinged with fuscous, thorax with a narrow anterior fuscous band. Legs fuscous, posterior pair ochreous white, abdomen greyish, posteriorly blackish. Forewings elongate, moderate. Costa hardly arched, apex obtuse, hindmargin obliquely rounded ; pale-ochreous ; markings dark-fuscous ; a narrow fascia from base of costa to one-fourth inner-margin ; three small spots in a line ; costal largest, from before one-third of costa to inner-margin at one-fourth, and meeting a suffusion from preceding fascia ; a moderate fascia from just before three-fourths of costa to anal angle, dilated on costa and anal angle ; a small suffused apical spot reaching nearly half across wing ; some scattered fuscous scales beneath this ; cilia ochreous, tinged with fuscous. Hindwings grey ; cilia grey, at base yellowish.

One specimen from Melbourne, Victoria.

Gelechia anthracephala, *n. sp.*

Female, 15 mm. Head and palpi black, antennæ black, thorax white. Legs blackish, posterior pair whitish, abdomen greyish.

Forewings elongate, moderate, costa hardly arched, apex pointed, hindmargin very oblique ; blackish-fuscous, with white markings ; a moderately large roundish basal spot, separated from costa by a streak of ground colour ; a broad irregularly-edged whitish fascia, anterior edge curved inwards, posterior edge with a slight projection below middle, occupying median third of wing ; a tooth-like patch on hindmargin immediately below apex ; a minute white spot on costa at five-sixths ; cilia fuscous, on tooth white, at apex black. Hindwings fuscous ; cilia greyish, becoming ochreous-whitish at base.

One specimen, Sydney, New South Wales, from Mr. Froggatt. The markings of this species are well defined.

GELECHIA MICROSPILOPLACA, *n. sp.*

Male, 14 mm. Head, palpi, antennæ and thorax blackish, palpi externally mixed with whitish, apex of second joint and apex of terminal joint whitish. Legs dark fuscous, mixed with ochreous-white. Forewings moderately broad, somewhat dilated posteriorly ; black ; a broad ochreous-white fascia, anterior edge slightly sinuate inwards in middle from one-third costa to one-third inner-margin, posterior edge from about middle of costa to middle of inner-margin, suffused and having two black dots on edge above middle ; within this patch or fascia is a small yet distinct black dot placed near posterior edge : an ochreous white streak from costa at three-fourths to hindmargin above anal angle, angulated inwards in middle so as to almost touch preceding fascia ; a fine whitish hindmarginal line, not reaching costa ; cilia fuscous, at base black. Hindwings and cilia light-fuscous, lighter towards base.

One specimen, Sydney, New South Wales. Allied to the preceding ; the black dot on the fascia is very noticeable, and indicates the species with certainty.

GELECHIA EPIMELA, *n. sp.*

Male, 13 mm. Head, palpi, thorax, palpi and antennæ fuscous-white, thorax with an anterior black transverse band broadest in middle. Legs fuscous-white, posterior pair broadly banded with black. Abdomen fuscous. Forewings moderate, elongate, costa hardly arched, apex round-pointed, hindmargin obliquely rounded ; fuscous grey-whitish ; markings black ; a strongly-curved fascia from base of costa to inner margin at one-fourth, broadest on costa ; two broad irregular quadrate spots on costa at one-third and two-thirds respectively, reaching half across wing, and converging to meet at base, leaving a small triangular spot of ground-colour on costa ; an apical streak reaching second spot at base ; cilia fuscous grey-whitish. Hindwings and cilia fuscous.

One specimen, Brisbane, in December.

GELECHIA NANA, *n. sp.*

Male, 13 mm. Head smooth, whitish; palpi and thorax pale-brownish ochreous, second joint of palpi whitish externally, apex of terminal joint with a blackish ring. Legs and abdomen greyish. Antennæ fuscous. Forewings elongate, slightly dilated posteriorly; ochreous-brown, a large irregular-cordate reddish spot at one-third from base, finely edged with black, its apex directed towards anal angle; seven fuscous spots on costa at about equal distances, three before middle, and four beyond smaller; a larger spot on fold immediately below first costal spot; a very fine blackish lunate mark, sometimes separated into two dots beneath fourth costal spot; a suffused fuscous dot-like hindmarginal line; a suffused whitish patch immediately above anal angle; cilia grey, basal half reddish-ochreous. Hindwings greyish-fuscous; cilia greyish, at base darker.

GELECHIA HÆMASPILA, *n. sp.*

Male, 14 mm. Head, thorax, legs, palpi, and abdomen greyish-ochreous; anterior legs fuscous, with whitish tarsal rings; terminal joint of palpi with suffused blackish rings above and below middle. Antennæ light-fuscous, annulated with whitish. Forewings shaped as in "*nana*," pale-ochreous; six quadrate, small fuscous spots on costa, two before middle, four beyond middle; two large reddish-fuscous spots edged with whitish, one at one-third in middle of wing, the other at two-thirds somewhat smaller; some fuscous scales towards apex and at base; cilia ochreous, tinged with fuscous. Hindwings light greyish-fuscous; cilia greyish-ochreous.

One specimen at light, Parkside, S.A., March 22, 1890. Closely related to the preceding, but differently marked.

GELECHIA MESOCHRA, *n. sp.*

Male, 12 mm. Head and palpi ochreous-white. Legs greyish. Antennæ and thorax fuscous (abdomen broken). Forewings elongate-linear, apex pointed; whitish-ochreous; a blackish streak along costa from base to near apex, attenuated anteriorly; a much thicker irregularly-edged streak along inner margin from base to anal angle, and continued suffusedly along hindmargin to apex, where it almost touches costal streak; cilia grey. Hindwings and cilia grey.

One specimen at Parkside, South Australia, in March, allied to *stratifera*, Meyr., but smaller, and with a costal streak.

CLEODORA MELIPHANES, *n. sp.*

Male, 11 mm. Head, thorax, palpi, antennæ, and legs pale whitish-yellow. Head more whitish posteriorly. Forewings

elongate, moderate, costa gently arched, apex pointed, hindmargin obliquely rounded; palpi whitish-yellow; cilia pale whitish-yellow; at apex with a well-marked ferruginous patch. Hindwings grey; cilia ochreous-grey.

One specimen at Blackwood, S. Australia, in November.

Pogonias (?) heliodora, *n. sp.*

Female, 12 mm. Head, palpi, legs, and thorax light ochreous-yellow; second joint of palpi with three narrow, black, apical rings; terminal joint with some scattered black scales; thorax with a large, suffused, blackish central blotch. Antennæ yellowish, annulated with black, especially beyond middle. Abdomen orange, anal segment somewhat blackish, posterior legs with tarsal rings of blackish. Forewings elongate-linear, ochreous-yellow, or clay colour, with six tufts of blackish scales, arranged as follows: three in an oblique row from about one-third costa to above one-fourth inner-margin; two much larger on inner margin (one at anal angle and one immediately before), and one small above last, but nearly on costa. All these spots appear anteriorly metallic when held in certain lights; the ground-colour is darker at one-third, and at and towards apex; an obscure white spot on costa near apex; a narrow streak of whitish around apex; cilia dark-fuscous. Hindwing elongate-lanceolate, dark-fuscous; cilia dark-fuscous, at base lighter.

A curious species. The tufts have a curious effect when held in different lights, appearing alternately colourless, iridescent, or black.

I took a single specimen at Duaringa, Queensland, in November, amongst grass.

Pogonias (?) trissodesma, *n. sp.*

Female, 15 mm. Head white; palpi black, second joint white, apex of terminal joint white. Thorax purplish-black. Antennæ and legs purplish-black. Tibiæ and tarsi ringed with white. Abdomen ochreous-whitish. Forewings rather narrow, elongate-lanceolate, purplish-black; three narrow, irregular, white fascia, first from one-fifth costa to fold, thence gently curved towards centre of wing, but not reaching it; second from middle of costa to middle of inner-margin, dilated in middle, and finely narrowed on lower half; third from five-sixths costa to just before anal angle, broadest on costa, and dot-like above anal angle; a minute white dot beyond second fascia, and two similar, one above the other, beyond first fascia; cilia light-greyish at apex, dark-fuscous on basal half. Hindwings and cilia fuscous.

A beautiful species, recalling a *Macrobathra* in general appearance. The second joint of palpi is somewhat tufted.

One specimen received from Gisborne, Victoria, taken by Mr G. Lyell, jun.

Pogonias heliotricha, *n. sp.*

Female, 17 mm. Head, palpi, antennæ and thorax blackish fuscous, sparsely dusted with white, apex of second joint whitish thorax with two narrow lines of white, starting anteriorly and meeting posteriorly in middle (abdomen broken). Legs fuscous-whitish. Forewings elongate-linear, apex pointed; blackish fuscous, with darker small tufts of scattered scales; costa and inner-margin obscurely edged with whitish; cilia dark-fuscous. Hindwings elongate-lanceolate; blackish; cilia bright yellow-ochreous, terminal portion and round apex and anal angle dark-fuscous.

One specimen received by Mr. G. Lyell, jun. The yellow cilia of the hindwings is a very definite character.

Pogonias capnopa, *n. sp.*

Female, 19 mm. Head, palpi, antennæ and thorax black, second joint of palpi dense and spreading. Legs black, hairs grey. Forewings elongate-linear, apex pointed; black, with scattered tufts of blacker scales; cilia greyish, blackish tinged. Hindwings elongate-lanceolate; blackish; cilia as in forewings.

This unicolorous black species is immediately known by the absence of markings.

One specimen received from Mr. G. Lyell, jun., of Gisborne, Victoria.

Pogonias porphyrescens, *n. sp.*

Male and female, 11-14 mm. Head, palpi, antennæ, legs, thorax and abdomen, abdomen with narrow white segmental rings, palpi, legs and abdomen beneath white. Forewings elongate-lanceolate; purplish-black, tufts same colour, apex and middle third of wing finely and obscurely dusted with whitish; cilia dark-fuscous. Hindwings narrow, linear; cilia blackish.

Parkside, South Australia, also Belair, South Australia, in December. Two specimens.

TINEIDÆ.

Blabophanes (?) heterogama, *n. sp.*

Male, 12 mm.; female, 18 mm. Head, thorax, and antennæ whitish, tinged with flesh-colour; head densely hairy; abdomen yellow-ochreous in male, greyish in female. Legs fuscous, in male posterior pair pale-yellow. Forewings elongate, costa gently arched, apex rounded, hindmargin obliquely rounded; dark-fuscous; a thick whitish streak along inner-margin from base to anal angle, and continued to middle of hindmargin, indented

above hindmargin ; the two indentations cause two sharp angulations of ground-colour ; cilia whitish-fuscous, with a blackish suffused hindmarginal line. Hindwings in male yellow, in female grey ; apices in both sexes infuscated in male, continued narrowly along hindmargin ; cilia in male fuscous, in female grey, tinged with fuscous at base.

One pair taken *(in cop)* at Coomooboolaroo, Duaringa, Queensland, in October (Coll. Barnard). This species may not be a true *Blabophanes*. At the time of describing the species I had not the characters of the genus, and consequently relied on memory, which, however, I do not think is in error.

MIMOSCOPA OPSIPHANES, *n. sp.*

Female, 23 mm. Head rough, whitish, mixed with light-fuscous. Thorax white, patagiæ fuscous, abdomen greyish ; palpi, antennæ, and legs grey-whitish ; anterior legs fuscous. Forewings elongate, costa gently arched, apex rounded, hindmargin obliquely rounded ; pale brownish-ochreous, with numerous suffused blackish, fine longitudinal lines ; extreme costal edge white from near base to near apex, most prominent in middle ; a moderately broad white longitudinal median streak from base to apex, with a fine line of ground-colour, becoming bifurcate beyond middle, and continued nearly to apex ; a small black dot on lower portion of white streak at two-thirds ; cilia grey-whitish, becoming fuscous at base and round apex ; hindwings and cilia grey-whitish, becoming fuscous-tinged at apex.

Two specimens beaten from *Casuarina quadrivalvis* at Blackwood, South Australia, in April. Probably feeds on above-named tree. The markings are (as Mr. Meyrick points out) very similar to some species of *Xyloryctidæ*, e.g., *Catoryctis tricrena*, Meyr.

PLUTELLIDÆ.

TRITYMBA XANTHOCOMA, *n. sp.*

Male, 20 mm. Head, palpi, antennæ, legs, and thorax dark fuscous. Abdomen yellow. Forewings elongate-lanceolate, moderately broad ; dark bronzy-fuscous, shining ; cilia bronzy-fuscous, lighter at base. Hindwings dark bronzy-fuscous ; cilia bright yellow, at and around apex and hindmargin dark-fuscous.

Two specimens Parkside, South Australia, in October.

Allied to *scæopis*, Mey., but the cilia of hindwings distinguish it from that species.

TRITYMBA DASYBATHRA, *n. sp.*

Male, 21 mm. Head dull-ochreous ; antennæ fuscous. Legs fuscous, posterior pair greyish ; palpi greyish. Thorax and abdomen greyish ; thorax with a suffused blackish central spot. Fore-

wings elongate-moderate ; costa gently arched, strongly towards apex ; apex acute, hindmargin oblique, continuous with inner-margin ; silvery-grey ; a black basal patch, trifurcate on anterior portion ; a blackish, round spot in middle of wing near apex ; cilia grey, fuscous tinged. Hindwings fuscous ; cilia as forewings.

One specimen at Parkside, South Australia, in December.

Allied to the preceding.

DEPRESSARIADÆ.

Enæmia pyrochrysa, *n. sp.*

Male, 32 mm. Head, antennæ, legs, palpi, and abdomen fiery-orange ; posterior and middle legs and abdomen beneath whitish-yellow. Thorax whitish-yellow, with anterior and median transverse, narrow, fiery-orange bands, and a narrow, median, longitudinal stripe. Forewings elongate-oblong, dilated somewhat posteriorly ; light ochreous-yellow ; costal edge fuscous towards basal third. Two very irregular transverse fuscous fasciæ : first from beyond one third of costa to one-fourth inner-margin, suffused on lower half, upper portion connected with a very large apical and hindmarginal patch of dark-fuscous, which contains a roundish spot of ground-colour beneath apex, and five small, cuneiform spots of same in a curve at three-fourths ; second fascia from lower portion of this patch, starting at end of cell, narrow and dentate, ending on inner-margin just beyond middle, but sending an oblique, narrow streak to anal angle from middle, the veins on the patches of ground-colour are outlined with scarlet ; cilia ochreous-white, with a fuscous hindmarginal line, except beneath apex. Hindwings and cilia bright deep-orange.

One specimen from Cairns, Queensland, in October.

Enæmia callianthes, *n. sp.*

Female, 25 mm. Head ochreous-white. Palpi, thorax, and antennæ dark-fuscous ; terminal joint of palpi ochreous-white ; thorax with a posterior ochreous-white triangular patch. Abdomen orange-red. Legs reddish-ochreous. Forewings moderate ; costa gently arched, apex obtuse ; hindmargin oblique, dark-brown, with ochreous-white markings ; a large, subquadrate patch at base, but not reaching costa ; two triangular patches, one on costa at one-third, the other immediately below on inner-margin ; two similar, but much larger patches at three-fourths, one on costa, one on inner-margin opposite, their apices nearly touching ; a small apical spot ; cilia ochreous-white, at anal angle fuscous. Hindwings reddish-orange ; a suffused, fuscous, apical blotch extending to middle of hindmargin ; cilia orange-red, round patch fuscous.

Two specimens at Mackay, Queensland, in December.

Pedois neurosticha, *n. sp.*

Male, 25 mm. Head, palpi, antennæ, legs and thorax ashy-grey whitish, second joint of palpi with black apical and subapical rings, legs whitish externally, abdomen greyish-fuscous. Forewings elongate-oblong, moderately broad, costa arched, strongly at base, hindmargin obliquely rounded; ashy-grey whitish, with innumerable spots and dashes and fuscous, a darker obscure discal dot before middle, a second, in a line with first, beyond middle; a hindmarginal row of well-defined dark-fuscous dots, sometimes extending to apical fourth of costa, preceded by a dentate suffused line of dark-fuscous, from middle of costa to anal angle; cilia grey-whitish. Hindwings fuscous-grey, costal third whitish; cilia grey, with a darker median line.

Two specimens from Gisborne, Victoria, sent by Mr. G. Lyell, jun., and taken in November.

GRACILARIADÆ.

Gracilaria polyplaca, *n. sp.*

Female, 11 mm. Head whitish, maxillary palpi pale-crimson, labial palpi white, second joint pale crimson, abdomen greyish-ochreous. Legs ochreous-whitish, anterior pair tinged with pale-crimson, all tarsi with slender blackish apical rings. Forewings narrow, crimson, with five costal streaks, one hindmarginal, and four dorsal streaks of creamy-yellowish; a hardly perceptible creamy-yellowish spot on costa near base; first costal spot small, irregular quadrate; second reaching half across wing, curved-elongate; third narrow-elongate, lying along costa; fourth similar to second, fifth similar to third, but suffusedly margined beneath with dark-fuscous; dorsal streak irregular, semiovate, creamy-yellowish, first at about one-third, second in middle, third near anal angle; hindmarginal streak distinctly yellowish-tinged from just below apex to near anal angle; a black spot on costa near apex, edged suffusedly anteriorly with fuscous; cilia greyish-ochreous, with a crimson apical hook. Hindwings and cilia dark-grey.

One specimen at Duaringa, Queensland, in December. Between *Ida*, Meyr., and *formosa*, Stt., but differs from either in having less costal and dorsal streaks, besides other details.

Gracilaria heteropsis, *n. sp.*

Male, 11 mm. Head and palpi snow-white, second joint of palpi ochreous-tinged. Thorax and antennæ golden-ochreous, thorax with a snow-white anterior spot; abdomen ochreous-grey, beneath white. Legs white, anterior pair infuscated, tarsi of posterior and middle legs fuscous. Forewings slightly dilated

posteriorly; golden-ochreous, with iridescent whitish-blackish margined markings, except a broad white streak along inner-margin from base to near hindmargin; extreme costal edge slenderly-whitish from about middle to apex; a narrow sub-costal streak from base to beyond middle of wing, slightly deflected to middle; an oblique streak from middle of inner-marginal streak; a similar oblique streak from middle of costa to middle of wing above anal angle, and there almost touching a similar streak from apex of broad inner-marginal streak; two slender parallel fascia, angulated in middle, starting from small wedge-shaped, snow-white costal spots, and reaching anal angle, lower half of space between fascia and hindmargin reticulated with blackish; a cartridge-shaped white hindmarginal patch occupying apical portion of wing, and containing a small black spot edged with dull metallic; a black hindmarginal line; cilia golden-brown, with a white tooth above black spot, and a smaller one on middle of hindmargin. Hindwings fuscous; cilia greyish-ochreous.

One specimen at Duaringa, Queensland. Nearest *nereis*, Meyr., but is very different.

Remarks on South Australian Rhopalocera.

By Oswald B. Lower, F.E.S., &c.

[Read May 1, 1894.]

In vol. XVII., Part II., Transactions of our Society, Mr. J. G. O. Tepper has given what purports to be a criticism, or reply, to my paper published in Part I. of the same volume. I shall remark on the species *seriatim*.

Delias aganippe, *Don.*

The figure in Mr. Tepper's former paper (1881) either represents this or some fictitious species. It is certainly not "*Harpalyce*." I have the whole of the catalogued Australian species, and the figure approaches "*aganippe*" the most. If, as Mr. Tepper suggests, it may be "*argenthona*," all I can say is that such plates are very misleading and worse than useless. Some years ago I received a poor specimen of the latter species from Mr. Tepper under the name of "*aganippe*." This, I think, is how the confusion has occurred.

D. harpalyce, *Don.*

This has *not* been taken in South Australia up to the present.

D. argenthona, *Fab.*

This is essentially an Eastern Australian insect, and has not yet been recorded from Victoria. I should be very pleased to place it on the list, but the locality requires confirmatory information, Mr. Angas notwithstanding. It does seem strange that, with so many zealous (?) collectors, Mr. Tepper enumerates that this species has been overlooked (?) for so long.

Belenois perimale, *Don.*

This I *did not* include in my list. It has never to my knowledge been taken in S.A. I have specimens from Port Darwin and Sydney; it does not occur in Victoria. As Miskin rightly points out, this is the var. of *Pieris scyllara*, Macleay; it has light-brown hindwings on the underside. Mr. Tepper exhibited at one of our meetings species of *Pieris teutonia* as this species, hence the confusion.

Danais petilia, *Stall.*

This *is* a widely different species from *chrysippus*, Linn. I saw in one of the Museum cases a specimen of a female *Hypolimnas*

misippus (as coming from S.A.) labelled in Mr. Tepper's handwriting as above, *i.e.*, *chrysippus*; it is in this manner that errors of locality are recorded.

DANAIS ERIPPUS, *Cram.*

This may be a "notoriously modern introduction," but it is *not* "sporadic."

XENICA ACHANTA, *Don.*

This was *not* in Mr. Tepper's list, hence my reason for mentioning it.

PYRAMEIS ITEA, *Fal.*

Of this species Mr. Tepper says, "The stinging nettle cannot have been the original food-plant of this species." I did not say it was the *original* food-plant, but I did say that the species feeds on it, and can be reared in the usual manner. My Notes were intended as a guide to future students.

P. KERSHAWI, *McCoy.*

I always admitted that this species is a very slightly divergent form of "*cardui.*" My reason for adopting the first name was on account of it being better known, and out of respect to Prof. McCoy. Mr. Tepper miscontrues my remarks when he says that "dry cowdung" cannot be the proper shelter of the chrysalides of this species. I simply mentioned the fact as being of general interest to collectors, and never thought for an instant that it was the "proper" shelter, but more likely an adaptation to circumstances.

JUNONIA VELLIDA, *Fal.*

The word "*Junonisa*" is wrong. I should have thought Mr. Tepper would have noticed the error.

LUCIA LUCANUS, *Fabr.*

Most of the genera of Lycœnidæ are not separated by very slight differences, as Mr. Tepper would have us believe. It is not my intention to write a dissertation on the family, but I could point out well-marked differences in the genera *Polyommatus*, *Cupido*, *Lucia*, &c. The "qualifying terms" are *not* exaggerated in this instance. For the benefit of Mr. Tepper and others not conversant with the species I may mention that "*lucanus*" is in general appearance very like *Lycœna agricola*, D. & H., but has a fiery copper discal area; in "*aurifer*" the shape of wings is quite different; in fact, as dissimilar as can be, being in shape like *Euchloris (Iodis) bipunctifera*, Walk., with its peculiar angulated hindwing. The chequered cilia of "*lucanus*"

is wanting in *aurifer*. I strongly suspect Mr. Tepper has not yet seen the true "*aurifer*," but is referring to "*œnea*," Miskin. Sir W. MacLeay did *not* confuse two species when he gave Mr. Tepper the name "*discifer*," H. S., this name, as I mentioned. being synonymic with "*lucanus*." Kirby's Synonymic Catalogue, quoted by Mr. Tepper, is not a masterpiece on the subject, and sadly requires revising. Mr. Tepper has miscontrued my remarks with regard to this species frequenting "Stinkwort." It is incorrect to say I "suggested" this as being the food-plant. I mentioned the fact of its "frequenting" stinkwort for the benefit of those interested in our branch of Natural History, and the reference is not misleading.

Ogyris, *Westw.*

Before making any remarks in answer to Mr. Tepper's criticisms, I would advise him to study Miskin's revision of the genus (Proc. Linn. Soc., N.S.W., 1890), wherein the doubts and differences of several species are set at rest. What I wrote on this genus is substantially correct, and admits of no doubt, with the exception perhaps of *O. amaryllis*. In reference to this species, I have recently received a communication from Mr. E. Guest, of Hoyleton, stating that he has taken this species and "*orœtes*" *in cop.* This almost convinces me that they are one and the same species, but what I cannot understand is the well-marked difference on the underside of the two species. In the sexes of all the other species the markings of the underside are identical, and it seems very strange that such expert Lepidopterists as Hewitson and Miskin should make mistakes. Miskin says Hewitson's figures represent *females* of both "*orœtes*" and "*amaryllis*." Mr. Tepper says it is the *male* "*orœtes*" which is shown. I possess what is said to be female "*orœtes*." It is the identical species which Miskin identified and based his conclusions on, but really I must acknowledge that the specimen is not in a condition to decide with any accuracy as to it being a *female*, as Miskin makes it. In conclusion, I may here say that I intend to keep the two(?) species separate until confirmatory evidence is forthcoming to show that they are one and the same species. I think that Mr. Tepper's remarks respecting "*idmo*" and "*halmaturia*" call for no special remarks, but as he has challenged my decisions I must retaliate. I here again state that the so-called *female* "*halmaturia*," Tepp., is the *male* of *idmo*, Hew., and the so-called *male* "*halmaturia*" is identical with Felder's figure of the *male* "*otanes*." Miskin is in error in supposing it, *i.e.*, *otanes*, to be a small form of "*genoveva*." Any one has only to compare the published descriptions of the above-mentioned species to see that there is no difference. Kirby's inclusion of Hewitson's "*otrontas*" (I pre-

sume Mr. Tepper means "*orontas*") with "*idmo*" is either a misprint or mistake, and intended, it seems to me, for "*otanes*," as *orontas* is *without* the large pale spot of the forewing of the *female—vide* Mr. Tepper. The female "*orontas*" *has* a dull white sub-apical patch on the forewing. So has "*idmo*." So that it is Mr. Tepper's ideas which are "fanciful," and not mine. This I am prepared to prove at any time, only stipulating that he who is in the wrong shall acknowledge the error in the Transactions of this Society. Mr. Tepper's concluding remarks respecting "*amaryllis*" being probably "sporadic," express his private opinion.

On the Occurrence of the Fissurellid Genus *ZIDORA* in Australian Waters.

By Professor Ralph Tate.

[Read May 1, 1894.]

The genus *Zeidora* was instituted by A. Adams in 1860, for the reception of two Japanese shells having the outer aspect of *Emarginula* and an internal shelf as in *Crepidula*. Reeve in his monograph, 1873, figures the two species described previously by Adams. Two species referrable to this genus occur in Pliocene strata in Italy, upon one of which Sequenza, 1880, proposed his genus *Crepiemarginula*, which Boog Watson, "Challenger Report," 1886, relegates to a synonym. Mr. Beddome, Proc. Roy. Soc. Tasm. for 1882, p. 169 (1883), founded his genus *Legrandia* on an undoubted example of *Zidora*. Boog Watson, *op. cit.*, added another species to the genus, from the West Indies, making four in all known in living creation. It is not at all improbable that the shell I am about to describe is conspecific with Beddome's *Legrandia Tasmanica*. Fischer, "Manuel de Conch.," 1885, emended the spelling of the generic name to *Zidora*.

The genus is of extreme interest from a morphological point of view, which is enhanced by the beauty of ornament and rarity of occurrence of the shells. The animal of *Zidora* is unknown, and despite the analogy that the shell presents to *Emarginula* and *Puncturella*, Mr. Boog Watson is disposed to view the shell as an internal one, and that "its true place will probably be found among the Opisthobranchiata, perhaps in the neighbourhood of *Pleurobranchus*."

The shells of the living species have hitherto been obtained only from moderately deep water.

Zidora Legrandi, *spec. nov.* (1894).

Shell depressedly conical, cap-shaped, white, delicate, elliptic-oblong in basal outline, rounded behind, truncately rounded and deeply cleft in front, with a narrow sunken fissural band extending to the apex; back depressedly convex; apex minute and short, hooked and somewhat adpressed, almost reaching the posterior margin.

The ornament consists of concentric threadlets and obliquely radial threadlets, which produce an elegant cancellation of rhombic spaces; in the apical region the ornament is extremely fine, but beyond it the cancellation is visible to the unaided eye

(there are about nine rows of rhombic spaces in a radial distance of 2 millimetres measured from the periphery). The margin of the aperture is closely crenulate-serrate. The fissural band is margined on each side by an elevated rounded keel, which is crenately sculptured; the scars on the fissural band are arched, sharp and close, but not contiguous.

The inside is glossy and smooth; the septum is narrowly crescentic (extending in the middle line to about one-fifth and on the sides to about one-fourth of the length of the aperture), much depressed posteriorly (about one-half the depth of the shell) becoming shallower on the anterior border, which almost reaches the base of the shell.

Dimensions.—Antero-posterior diam., 9·5; lateral diam., 6·; height, in about the middle line, 2· (vix); depth of cleft, 2 millimetres.

Localities.—Corney Point, Spencer Gulf, one example from shell-sand *(Dr. Perks);* dredged in 7 to 20 fathoms in Backstairs Passage, five dead examples *(Dr. Verco).*

Remarks.—Mr. Beddome's definition of the genus and species of *Legrandia Tasmanica* reads as follows:—

"LEGRANDIA, shell emarginulaform, but with an internal plate like Crypta.

LEGRANDIA TASMANICA, shell oval, radiately ribbed; front edge fissured; interior with a shelly plate extending one-fourth the length of the shell. Long., 5 mill.; lat., 3 mill.; alt., ·75 mill. Habt., Kelso Bay, Tamar River, 17 fms."

The specific description barely permits of a comparison with the South Australian specimens, though there is a substantial agreement in the size of the internal plate, and the exterior dimensions are proportionately the same, the measures of the Tasmanian shell being about one-half of the largest of the South-Australian specimens.

Without comparison of actual specimens it is impossible to establish identity, though there is presumptive evidence that the two shells belong to one species. In this latter consideration I have thought it best, as is the practice in botanical nomenclature, when a generic name is suppressed to employ it as a specific name for the type-species, and so preserve the intention of the original author, in this case to compliment the veteran conchologist of Tasmania, Mr. Legrand.

Of the three living species diagnostically known and figured, *Z. Legrandi* seems to resemble *Z. calceolina* more than the others; but in one particular it differs from all, namely, by its apex situated within the vertical plane of the posterior margin, and not as in them projecting beyond the periphery.

Descriptions of Micro-Lepidoptera from Moreton Bay.

By A. Jefferis Turner, M.D.

[Read March 6, 1894.]

I shall endeavor in these papers to give a complete list of the species which I have been able to identify as occurring in the neighborhood of Brisbane under the head of each genus treated of; and to describe any species believed to be new with regard to whose generic position I feel satisfied. The admirable work of Mr. Meyrick on the Australian micro-lepidoptera has alone rendered any such work by a local naturalist possible, and I cannot too strongly express my indebtedness to his papers for any worth that my own may possess. I must also express my indebtedness to Mr. Lower, of Adelaide, for advice and assistance, and to Dr. Lucas and Mr. Illidge, of Brisbane, for access to their valuable collections.

GRACILARIDÆ.

Gracilaria, Z.

This beautiful and easily recognised genus appears to be well represented about Brisbane. Besides the twenty-one new species here described, I have obtained here the following :—

Grac. xanthopharella, Meyr.
" *plagata*, Stt.
" *autadelpha*, Meyr.
" *calicella*, Stt.
" *chalcoptera*, Meyr.
" *formosa*, Stt.
" *ida*, Meyr.
" *eumetella*, Meyr.
" *laciniella*, Meyr.
" *albomarginata*, Stt. (?)

I have reared *Grac. laciniella*, Meyr., from larvæ, using the leaves of *Eucalyptus sp.* I am not quite certain of the identification of *Grac. albomarginata*, Stt., but I have one specimen which generally corresponds to the description, except in having blackish antennæ.

Grac. plagata, *Stt.*

Middle tibiæ very much thickened with greyish-ochreous

black-tipped scales, forming a distinct crest on their upper surface.

Brisbane; taken occasionally on fences in September.

Grac. albospersa, n. sp.

14 mm. Head, thorax, and maxillary palpi greyish-ochreous. Labial palpi with apical fourth of second and terminal joints thickened with scales, so as to form minute tufts, greyish-ochreous; apical third of second joint, external surface and apical half of upper surface of terminal joint suffused with dark fuscous; extreme apex whitish. Antennæ longer than forewings, greyish-ochreous annulated with fuscous. Abdomen greyish-ochreous. Posterior third suffused above with fuscous, beneath with five pairs of black dots. Legs pale ochreous-fuscous; apical portions of tarsal joints dark fuscous; middle tibiæ densely thickened with dark fuscous scales. Forewings ochreous-fuscous, sparsely irrorated with black scales, with irregularly outlined white markings; a white dot on costa, near base, reaching to fold; a larger oblong white area on costa at one-fifth, reaching to fold; a similar area at two-fifths; two small irregularly outlined white dots on costa at three-fifths and four-fifths, and two more between the latter and apex; apex and anterior margin of two apical dots blackish; five white dots on inner margin at three-eighths, four-eighths, five-eighths, six-eighths, and seven-eighths, the first of which is larger than those following; cilia ochreous-fuscous, with two imperfect dark lines; beyond anal angle dark grey. Hindwings and cilia dark grey.

Resembles in coloring *Grac. syringella*, Fab. The minutely tufted apices of the labial palpi appear to be a peculiar character.

Brisbane; taken occasionally on fences in spring.

Grac. chlorella, n. sp.

12 mm. Head, face, and thorax whitish-ochreous. Maxillary palpi whitish-ocreous, with two black annulations; labial palpi externally blackish, extreme apex whitish-ochreous; internally whitish-ochreous, annulated with black at apex of second joint, about middle of terminal joint, and again before apex. Antennæ whitish-ochreous, sharply annulated with black. Abdomen dark ochreous-fuscous, becoming blackish at apex. Legs, anterior and middle tibiæ ochreous-fuscous, densely irrorated with black; middle tibiæ much thickened with scales; posterior tibiæ whitish, annulated with black; tarsi whitish, annulated with black. Forewings ochreous-fuscous with a greenish tinge, densely irrorated with black scales, these are especially dense over costal half of disc and towards base; five costal and four dorsal ill-defined irregularly outlined whitish-ochreous spots; cilia ochreous-

fuscous irrorated with black, at anal angle and inner margin dark grey. Hindwings and cilia dark grey.

In general appearance comes very near to *Grac. syringella*, Fab.

Brisbane ; one specimen on a fence in September.

GRAC. EURYCNEMA, n. sp.

15-16 mm. Head and thorax reddish-fuscous ; face and maxillary palpi paler ; labial palpi, terminal joint as long as second, stout, and obtuse at apex, dark fuscous, internal surface whitish. Antennæ longer than forewings, greyish-ochreous annulated with black. Abdomen ochreous-fuscous, anterior half of upper surface paler. Legs ochreous-fuscous ; tarsi annulated with dark fuscous ; anterior and middle tibiæ dark fuscous, the latter densely thickened with scales. Forewings reddish-ochreous-fuscous irrorated with blackish scales, especially on costa and inner margin ; cilia reddish-ochreous-fuscous on costa, dark fuscous on hindmargin, dark grey on inner margin. Hindwings and cilia dark grey.

The resting position of this insect is an exaggeration of that common to most of the genus. The first two pairs of legs form a wide elevated arch on which the forewings closely appressed appear to rest at a very steep angle.

Brisbane ; taken occasionally on fences in August and September.

GRAC. EUGLYPTA, n. sp.

14 mm. Head and thorax reddish-ochreous. Maxillary palpi whitish, apex reddish-ochreous ; labial palpi whitish, extreme apex reddish-ochreous, and somewhat thickened with scales ; terminal joint shorter than second, apex moderately acute, reddish-ochreous with two transverse fuscous lines on external surface. Antennæ larger than forewings, whitish-ochreous annulated with fuscous. Abdomen ochreous, upper surface suffused with fuscous posteriorly, two pairs of black dots on lower surface, apical tuft ochreous. Legs reddish fuscous ; anterior femora upper half whitish, lower half dark fuscous ; anterior tibiæ dark fuscous ; middle tibiæ densely thickened with scales, bases of tarsal joints whitish. Forewings pale reddish-ocherous irregularly mottled with darker reddish-ochreous, the whole showing a violet reflection in oblique light ; costa whitish-ochreous from one-fourth to apex ; a distinct black dot on costa at one-fourth and another at one-half, beyond the latter are two or three very minute costal dots ; cilia reddish-ochreous with two incomplete hindmarginal lines, on inner margin dark grey. Hindwings and cilia dark grey.

Apparently allied to the preceding.

Brisbane ; one specimen on a fence in September.

GRAC. XYLOPHANES, n. sp.

9-12 mm. Head and thorax reddish-ochreous. Face and maxillary palpi whitish-ochreous; labial palpi pale reddish-ochreous, second and terminal joint dark fuscous at apex, terminal joint also with a dark fuscous line at one-third on external surface. Antennæ longer than forewings, greyish-ochreous annulated with fuscous. Abdomen ochreous-fuscous, paler beneath. Legs whitish, apex of tarsal joints fuscous; lower third of anterior femora dark fuscous; anterior and middle tibiæ dark fuscous, the latter densely thickened with scales. Forewings reddish-ochreous, becoming whitish-ochreous on costa, irregularly mottled with reddish-fuscous; an ill-defined transverse fascia of the paler ground-color at one-third, narrowing from costa to inner margin; a few minute fuscous dots on costa and hindmargin; cilia ochreous-fuscous with two darker lines, beyond anal angle dark grey. Hindwings and cilia dark grey.

The forewings are shorter than those of the preceding and proportionately broader. The markings of forewings are very obscure.

Brisbane; taken occasionally on fences in September.

GRAC. OCTOPUNCTATA, n. sp.

10-12 mm. Head clear white. Thorax dark fuscous. Face and maxillary palpi whitish; labial palpi white, apex of second joint dark fuscous, terminal joint with two dark fuscous transverse lines at half and before apex. Antennæ grey annulated with dark fuscous. Abdomen above dark fuscous, beneath ochreous-fuscous. Legs dark fuscous, tarsal joints white except at apices, middle tibiæ densely thickened with scales, upper half of anterior femora yellowish-white. Forewings dark fuscous, with four spots white, faintly yellowish tinged and narrowly outlined with black; first on inner margin at one-fourth, reaching to fold, produced along margin almost to base; second on costa before half, parallel-sided, outwardly oblique, not quite reaching fold; third on inner margin at two-thirds, broadest on margin, triangular or trapezoidal, reaching beyond fold; fourth on costa at three-fourths, similar to second, directed towards but not reaching anal angle; cilia dark fuscous with three blackish hindmarginal lines. Hindwings and cilia dark grey.

Brisbane; three specimens taken at light in April.

GRAC. TRAPEZOIDES, n. sp.

10 mm. Head, thorax, and maxillary palpi pale grey; labial palpi whitish, second joint at apex, and terminal joint at three-fourths ringed with black. Antennæ grey, not annulated. Abdomen dark-fuscous above, whitish beneath. Legs whitish,

tarsal joints dark-fuscous at apex, anterior and middle tibiæ dark-fuscous at base and apex, the latter scarcely thickened. Forewings ochreous-fuscous, with four inner marginal dots clear white and four costal streaks whitish-ochreous, all margined with dark-fuscous; first inner marginal dot close to base, parallel-sided, fascia-like, reaching almost to costa, upper margin ill-defined; second at one-fourth, triangular, with rounded apex, broadest on margin, reaching two-thirds across disc; third at half trapezoidal, broadest on margin, reaching slightly beyond middle of disc; fourth at anal angle, smaller, roundish—from it is a narrow whitish suffusion along hindmargin towards apex; costal streaks narrow, parallel-sided, outwardly oblique, at half, three-fourths, five-eighths, and just before apex; the second is twice as long as the others, and is directed towards but do not reach anal dot; apical angle narrowly black-margined; costal cilia black, hindmarginal ochreous-fuscous, inner-marginal dark-grey. Hindwings and cilia dark-grey.

Brisbane; two specimens taken by Dr. Lucas.

GRAC. IRRORATA, n. sp.

6-8 mm. Head, thorax, face, and maxillary palpi white. Labial palpi white, second joint at apex and terminal joint beyond middle annulated with black. Antennæ dark-grey. Abdomen fuscous above, whitish beneath. Legs white, anterior tibiæ blackish; middle tibiæ very slightly thickened, blackish at base and apex; posterior tibiæ with three blackish annulations, clothed above with stiff white hairs; basal joints fuscous at apex. Forewings greyish-ochreous, with four white transverse fasciæ, all finely irrorated with greyish-ochreous scales, and thinly and irregularly outlined with black; first perpendicular at one-fourth, broad both on costa and inner-margin, produced along inner-margin to base, anterior margin encroached upon by ground-colour below centre of disc to almost half its thickness; second at half, perpendicular, margins slightly irregular; third from costa at three-fourths to inner-margin before anal angle, perpendicular, attenuated in centre of disc, where it is also interrupted by black scales; fourth from costa near apex to anal angle, where it is almost confluent with third, posterior margin ill-defined; hindmargin greyish-ochreous, narrowly edged with black; cilia whitish-grey, with two black hindmarginal lines. Hindwings and cilia grey.

Apparently allied to *Grac. ordinatella*, Meyr.

Brisbane; two specimens at light.

GRAC. CALICELLA, *Stt.*

This species is occasionally variable in its markings. In many Brisbane specimens the basal dot reaches costa to form a com-

plete fascia, as in Stainton's original description. I have one specimen in which the anterior costal dot is confluent with that on inner-margin at anal angle; and have seen another in which the anterior costal dot is altogether absent, while the anal dot is produced to costa, absorbing the posterior costal dot.

Brisbane. Taken commonly on fences in August and September. Also one specimen at Bulli, N.S.W., in October.

Grac. albomaculella, n. sp.

7 mm. Head, thorax, face, and maxillary palpi clear white. Labial palpi white, second joint at apex, and terminal joint beyond middle annulated with black. Antennæ dark-grey. Abdomen fuscous above, whitish beneath. Legs whitish, tarsal joints fuscous at apex, anterior and middle tibiæ dark-fuscous at apex, the latter slightly thickened. Forewings ochreous-fuscous, with one fascia and six spots, clear white, narrowly black-margined; first spot on inner-margin close to base, rounded above, not reaching to fold; fascia before one-third, slightly outwardly oblique, narrow and parallel-sided from costa to just before fold, where it suddenly dilates to treble breadth, and is thus confined to inner-margin; second spot on costa at one-half, slightly outwardly oblique, reaching one-third across disc, rounded below; third spot on inner margin at three-fourths, larger than second, rounded above, not reaching centre of disc, widely separated from second; fourth in disc at three-fourths, slightly above centre, very minute, connected with costa by a blackish cloud; fifth very small at anal angle; sixth parallel-sided, very oblique from costa at seven-eighths to middle of hindmargin; cilia ochreous-fuscous, with a black line near apex, on inner-margin dark-grey. Hindwings and cilia dark-grey.

Closely allied to *Grac. calicella*. Stt., and *Grac. hoplocala*, Meyr. Besides minor differences it may be distinguished from the former by the absence of one costal spot, and from both by the presence of an additional inner-marginal and a discal spot.

Brisbane; one specimen taken on a fence in August.

Grac. obscurella, n. sp.

8 mm. Head, thorax, face, and maxillary palpi ochreous-whitish. Labial palpi ochreous-whitish, terminal joint annulated beyond middle with pale-fuscous. Antennæ longer than forewings, greyish-ochreous, gradually darkening toward apical half, which is dark-fuscous. Abdomen above ochreous-fuscous, beneath ochreous-whitish. Legs whitish, tarsal joints fuscous at apices; anterior and middle tibiæ fuscous, with two obscure whitish annulations, the latter moderately thickened at apex with dark-fuscous scales; posterior tibiæ whitish, clothed above with stiff

hairs. Forewings pale ochreous-fuscous, irrorated with darker scales; with five narrow indistinct transverse fasciæ, pale ochreous-fuscous, transverse or slightly outwardly oblique from costa at one-eixth, two-sixths, three-sixths, four-sixths, and five-sixths, the last two becoming obsolete towards inner-margin; a triangular whitish spot on costa before apex, extending into costal cilia; apex darker ochreous-fuscous; cilia pale ochreous-fuscous, with indistinct darker hindmarginal line. Hindwings and cilia dark-grey.

A very inconspicuous species, not nearly allied to any with which I am acquainted.

Brisbane; one specimen on a fence in September.

GRAC. ENCHLAMYDA, n. sp.

8-9 mm. Head and thorax whitish or ochreous-whitish. Face and maxillary palpi whitish. Labial palpi whitish. Antennæ dark-grey. Abdomen above dark-fuscous, beneath whitish. Legs whitish, tarsal joints dark-fuscous at apices; anterior tibiæ and first tarsal joints dark-fuscous; middle tibiæ with three dark-fuscous annulations, not thickened. Forewings whitish or ochreous-whitish, the middle third occupied by a broad fascia, ochreous-fuscous, narrowly edged with black, anterior margin outwardly oblique from costa, posterior margin less oblique, slightly convex; basal one-sixth of disc suffused with ochreous-fuscous; outside the transverse fascia are two variable longitudinal, parallel black lines, one in centre of disc, the other between that and costa; a roundish subapical costal spot, ochreous-fuscous, margined with black, or entirely blackish; extreme apex ochreous-whitish; cilia on costa ochreous-fuscous, on hindmargin whitish-ochreous, with median black line; on inner-margin dark-grey. Hindwings and cilia dark-grey.

A very distinct species, somewhat variable.

Brisbane; three specimens taken on a fence in August and September.

GRAC. IDA, *Meyr.*

The typical form of this species is occasionally taken near Brisbane.

GRAC. IDA var. ROSEA, n. var.

Very distinct in its coloration, forewings clear crimson-pink, without any fuscous suffusion; markings more yellowish-tinged than in the typical form, but agreeing closely in detail, though both forms show slight variations.

This beautiful insect is common about Brisbane. I have frequently beaten it from the native box (*Tristania conferta*), but do not know the larva. It is quite distinct from *Grac. formosa*, Stt., which is also occasionally taken near Brisbane.

GRAC. AURORA, n. sp.

Head pale fuscous. Face silvery-white. Maxillary palpi yellow. Labial palpi reddish-orange, bases whitish, extreme apices fuscous. Antennæ longer than forewings, whitish-ochreous, with dark-fuscous annulations. Thorax reddish-violet above, bright yellow on sides. Abdomen above anteriorly whitish-ochreous, posteriorly ochreous-fuscous; beneath whitish. Legs, tibiæ reddish-violet, middle pair moderately thickened, tarsi whitish. Forewings brilliant-yellow; an ill-defined reddish-violet band, rather less than one-third breadth of disc, runs from base along inner and hindmargins to apex; in this band is a blackish dot at about one-fourth, and a second just outside this; several smaller blackish dots on inner margin, and five or six similar dots on hindmargin; cilia on costa yellow, on hindmargin reddish-violet towards apex, grey towards anal angle. Hindwings and cilia grey.

This brilliant insect appears to be allied to *Grac. adelina*, Meyr., from New Zealand.

Brisbane; one specimen taken on a fence in September by Dr. Lucas.

GRAC. FLUORESCENS, n. sp.

8–9 mm. Head and thorax ochreous-whitish. Face and maxillary palpi white. Labial palpi white, second joint externally pale-fuscous. Antennæ dark-fuscous. Abdomen dark-fuscous above, white beneath. Legs, anterior femora white, tibiæ dark-fuscous, tarsal joints dark-fuscous at bases, white at apices; middle femora dark-fuscous, tibiæ whitish, slightly thickened, and dark-fuscous at apices, tarsi as above; posterior tibiæ dark-fuscous above, white beneath; tarsal joints dark-fuscous, with white apices above, wholly white beneath. Forewings brassy-fuscous; a sharply-defined inner-marginal streak, one-third breadth of wing, yellowish-white, with brilliant metallic lustre, ending abruptly just before anal angle, posterior extremity dilated to one-half breadth of wing; the posterior margin of dorsal streak is edged with black, and often contains a minute black dot; on disc at seven-eighths is a black spot of somewhat irregular form, surrounded by an incomplete circle of brilliantly-lustrous white scales; from this a yellowish-white metallic suffusion extends to hindmargin just beyond anal angle; before apex a black spot extends from costa to hindmargin; extreme apex lustrous-whitish; cilia on costa first black then ochreous-whitish on hindmargin, ochreous-whitish becoming whitish at anal angle, with a black basal line at apex, and a black subapical hook, on inner-margin dark-grey. Hindwings and cilia dark-grey.

Allied to *Grac. nereis*, Meyr.

Brisbane. Taken commonly on fences in August and September.

GRAC. NITIDULA, n. sp.

6-7 mm. Head and thorax brassy. Face and palpi silvery-white. Antennæ grey. Abdomen ochreous-whitish, suffused posteriorly with fuscous, beneath white. Legs white; tarsal joints pale-fuscous at apices on external surface; middle tibiæ slightly thickened at apices with fuscous scales. Forewings pale ochreous-fuscous, with irregular fuscous suffusion, several metallic areas, and a variable number of whitish-ochreous spots sometimes forming interrupted fasciæ; spots minute quadrangular, most numerous on costa, the remainder on inner-margin, they form interrupted slender transverse fasciæ at one-fourth and one-third; basal fourth of wing occupied by a brilliant metallic patch with reddish and violet lustre; a similar triangular patch on inner-margin beyond middle, not quite reaching costa; a small oval spot with long axis longitudinal in disc at seven-eighths, nearer costa than anal angle, showing brilliant violet-blue reflections; apex occupied by a rather large black spot; cilia brilliantly metallic on hindmargin, ochreous-whitish at anal angle, thence grey. Hindwings and cilia grey.

A minute but very brilliant species of uncertain affinity.

Brisbane. Five specimens taken in tropical forest growth.

GRAC. MICROTA, n. sp.

7 mm. Head and thorax ochreous-fuscous. Face and palpi white. Antennæ dark-fuscous, basal third grey, basal joint dark-fuscous. Abdomen above dark-fuscous, beneath white. Legs, femora white; anterior tibiæ and tarsi ochreous-fuscous, extreme apices of joints dark-fuscous, last two joints whitish; middle tibiæ and first two tarsal joints thickened throughout, ochreous-fuscous; posterior tibiæ upper surface with numerous stiff hairs, whitish-ochreous, black at apex, beneath clear white; posterior tarsi above whitish, apices of joints black, beneath clear white. Forewings ochreous-fuscous, confusedly marked with fine dark-fuscous dots and lines which do not form any definite pattern; on inner-margin before and beyond middle are two obtusely-triangular yellow spots reaching middle of disc; these contain one or two blackish dots; a minute metallic spot just before apex; cilia ochreous-fuscous, with a blackish hindmarginal line, on inner-margin dark-grey. Hindwings and cilia dark-grey.

An isolated species, unless it be distantly related to that next described.

Brisbane; One specimen at light.

GRAC. PYROCHROMA, n. sp.

9-10 mm. Head and thorax bright-yellow. Face and maxillary palpi clear-white. Labial palpi white, second joint fuscous at apex, terminal joint with a median fuscous ring, beyond this yellowish. Antennæ longer than forewings, grey, basal joint yellow above, white beneath. Abdomen above fuscous, deepening in shade posteriorly, beneath white. Legs, anterior femora white, tibiæ and tarsi fuscous; middle tibiæ and first two joints of tarsi densely thickened with scales, reddish-fuscous, terminal joints not thickened, paler; posterior tibiæ and tarsi whitish. Forewings glossy reddish-purple, with darker purple dots, forming an interrupted line along costa; a bright-yellow dorsal streak from base, terminating abruptly at anal angle, edged with black, nearly half breadth of wing, indented to half its breadth, close to base and approximately at one-third, two-thirds, and at anal angle; costal edge from near base to apex occupied by a narrow, blackish-purple, irregularly-thickened line; internal to this is a narrow yellow line, sometimes suffused with reddish-purple; and internal to this again a longitudinal line in disc from two-thirds nearly to apex, with a metallic-blue lustre, narrowly bordered on each side with blackish; a brilliant-metallic spot at apex, and a yellow hindmarginal line continuous with that on inner margin; cilia whitish on costa, with a dark apical spot showing in certain lights a vivid-blue iridescence, on hindmargin reddish-fuscous, becoming paler towards anal angle, thence dark-grey. Hindwings and cilia dark-grey.

This brilliant insect rests with its head appressed to the surface. Except in the thickening of the basal tarsal joints of the middle pair of legs, it appears to agree structurally with this genus. I have not examined the neuration.

Brisbane; five specimens on a fence in August and September.

GRAC. ALBISTRIATELLA, n. sp.

7-8 mm. Head, thorax, face, and palpi white. Antennæ dark-grey. Abdomen above fuscous, beneath reddish-fuscous. Legs, anterior and middle pairs fuscous, posterior whitish; middle tibiæ not thickened. Forewings pale ochreous-grey, with a white line along inner-margin, and five costal and three dorsal white streaks; first costal streak at one-third, outwardly oblique, narrowly produced along costa half way to base; second from beyond middle, very oblique outwardly, produced as a very slender line to margin of fourth streak; third shortly beyond second, outwardly oblique, occasionally connected by a slender line from its base with second; fourth lustrous, coalescing with third dorsal to form an outwardly curved, slender, black-margined fascia from costa to anal angle; fifth a mere dot beyond fourth; first and

second dorsal streaks parallel and close, ontwardly oblique, from about three-fourths ; a white line along hindmargin, broadening from apex to anal angle ; a black dot shortly before apex ; cilia grey, with a black apical dot and a black basal line along hindmargin. Hindwings and cilia grey.

Brisbane ; three specimens.

GRAC. PARALLELA, n. sp.

8 mm. Head, face, and palpi pure white. Antennæ dark-fuscous. Thorax white, lateral margins fuscous. Abdomen fuscous. Legs dark-fuscous, apices of tarsal joints whitish ; posterior pair whitish beneath, middle tibiæ not thickened. Forewings fuscous-grey, with a broad white stripe along inner-margin from base to anal angle, upper edge wavy, black-margined ; immediately beyond or continuous with this is a white line from anal angle gradually alternating to about middle of hindmargin ; a slender white black-margined line from costa to three-fourths to hindmarginal line at anal angle ; a second similar line from costa before apex to extremity of hindmarginal line ; a slender white line along costa from one-fourth to first streak, black-margined beneath ; cilia white with a short median fuscous line at apex, thence white to anal angle, on inner-margin grey. Hindwings and cilia grey.

Allied to *Grac. didymella*, Meyr., and *Grac. ochrocephala*, Meyr. It may be distinguished from the former by the white line on costa, and from the latter by the pure white head and dorsal streak.

Brisbane.

GRAC. TRISTANIÆ, n. sp.

7-8 mm. Head, face, and maxillary palpi pure white. Labial palpi usually pure white, second joint sometimes fuscous at apex. Antennal white, extreme apex fuscous. Thorax white, lateral margins ochreous-fuscous. Legs whitish, tarsal joints fuscous at bases, anterior and middle tibiæ fuscous, the latter not thickened. Forewings ochreous-fuscous, with a broad pure white streak extending along whole of inner-margin, and continued along hindmargin to end abruptly just before apex, its upper edge narrowly margined with blackish, wavy, and twice indented, first slightly opposite two-thirds of inner-margin, and again deeply so as to be almost interrupted at anal angle ; a white dot at apex ; cilia white, with a black hook at apex, at anal angle and on inner-margin grey. Hindwings and cilia grey.

Allied to the same group as the preceding, but readily distinguished by the simpler marking of the forewings.

Larva slightly attenuated posteriorly, golden-brown without

markings, or with a fuscous oval spot placed transversely over dorsum of each segment, or over first segment only. Mines conspicuous blotches under the epidermis of the upper-surface of the leaves of the Native Box *(Tristania conferta)*, and may be found in abundance during the greater part of the year.

Brisbane.

GRAC. UNILINEATA, n. sp.

7-8 mm. Head, face, and palpi white. Antennæ white at base, gradually deepening to fuscous. Thorax white, lateral margins ochreous-fuscous. Abdomen above ochreous-fuscous, darker posteriorly, beneath white. Legs whitish, tarsi ringed with blackish fuscous, anterior and middle tibiæ blackish-fuscous at apex. Forewings ochreous-fuscous; a white dorsal streak from base ending abruptly close to anal angle, less than half breadth of wing, straight-margined; a white line along hindmargin from anal angle nearly to apex; apex black; a short longitudinal black line in disc beyond three-fourths, narrowly and interruptedly margined with white externally; cilia white, with a median black line and black subapical hook, at anal angle and inner margin grey. Hindwings and cilia grey.

Brisbane; two specimens.

GRAC. PLEBEIA, n. sp.

Head, face, and palpi white. Antennæ white at base, gradually deepening to fuscous. Thorax white, lateral margins ochreous-fuscous. Abdomen above ochreous-fuscous, beneath white. Legs whitish, tarsi ringed with fuscous, anterior and middle tibiæ fuscous at extremities. Forewings ochreous-fuscous; a white dorsal streak from base ceasing abruptly close before anal angle, half breadth of wing, straight margined; along its margin and at its extremity the ground colour is suffused with dark-fuscous; a triangular white spot on hindmargin, its apex reaching nearly to costa; a white streak from costa at four-fifths to extremity of inner-marginal line, ill-defined towards costa; apical portion of costa black, interrupted by a narrow white line, which meets apex of hindmarginal spot; cilia white, faintly ochreous-whitish at apex, with a black median line and sub-apical hook, along inner-margin grey. Hindwings and cilia grey.

This and the preceding two species are very similar. *Tristaniæ* may be distinguished by the indented inner-marginal line; *unilineata* by the straight inner-marginal line, less than half breadth of wing, and the short longitudinal black line on disc; *plebeia* by the straight inner-marginal line, half breadth of wing, and the triangular hindmarginal spot.

Brisbane; one specimen taken by Dr. Lucas.

ŒCOPHORIDÆ.

In dealing with this family, I have endeavored to adhere faithfully to the genera as laid down by Meyrick ; but have had to describe a few new genera which appear distinct from any of his. Of these the first two may not properly belong to this family at all ; but as they are very distinct insects, and easily recognised, I hope that no confusion may arise from including them here temporarily. *Callizyga* is peculiar in veins seven and eight both running to hindmargin, in the short, stout, terminal joints of the labial palpi, and in the disparity of the sexes.

In *Scorpiopsis* the neuration appears to be normal, except in the sigmoid curve described by vein seven of the hindwings, but the palpi and shape of forewing are peculiar.

Callizyga, n. g.

Head loosely scaled, side-tufts moderate. Antennæ stout, in male strongly ciliated (3-4), pecten absent. Palpi moderate, second joint reaching base of antennæ, with appressed scales ; terminal joint half as long as second, nearly straight, almost as stout as second. Thorax smooth. Forewings dilated, apex moderately acute, hindmargin sinuate. Hindwings as broad as forewings, cilia very short. Abdomen moderate in male, broad in female. Forewings with veins 7 and 8 stalked, both to hindmargin, 2 from before angle of cell. Hindwings normal. Sexes unequal.

Callizyga dispar, n. sp.

Male, 21-22 mm. ; female, 31-35 mm. Head and thorax pinkish-grey. Face and palpi ochreous-grey. Antennæ ochreous-grey. Abdomen in male bright-orange, in female ochreous. Legs whitish-ochreous, anterior tibiæ and tarsi pinkish-grey. Forewings in male ochreous-grey, with a slight pinkish tinge ; a few scattered fuscous scales, sometimes forming a streak from hindmargin below apex towards centre of disc ; cilia orange-yellow ; underside bright orange-red. In female pinkish-grey, with a slight ochreous tinge ; a few scattered fuscous scales towards hindmargin ; cilia yellowish. Hindwings and cilia in male bright orange-yellow. In female pale ochreous-yellow ; cilia sometimes tinged with fuscous.

Brisbane. Beaten occasionally from *Eugenia*.

Scorpiopsis, n. g.

Head with appressed scales, side tufts moderate, closely appressed, slightly projecting between antennæ. Antennæ moderate (ciliations in male unknown) ; pecten absent. Palpi long, second joint exceeding base of antennæ ; terminal joint much shorter than second, rather stout, with a well-developed

short tuft on its posterior aspect shortly before apex. (Thorax imperfect.) Forewings moderate, apex rounded, hindmargin convex, not oblique. Hindwings broader than forewings, oblong-ovate, cilia less than one-third. Abdomen rather stout. Forewings with seven and eight long-stalked, eight to apex, seven to hindmargin, two from before angle of cell. Hindwings with v. 7 bent in a sigmoid curve so as to be approximated to six on disc, and diverging from it to hindmargin.

Scorpiopsis superba, n. sp.

Female, 20 mm. Head and face red, mottled with pale yellow. Palpi, second joint reddish-ochreous, internal surface whitish, ringed with white at apex, extreme apex red; terminal joint moderate, with a short posterior tuft about one-fourth its length just before apex, red, basal half whitish on posterior surface, apex beyond tuft whitish. Antennæ stout, reddish-ochreous. Thorax red mottled with pale yellow, shoulders white. Abdomen ochreous-whitish, tuft whitish. Legs whitish, anterior tibiæ and tarsi red, the latter with white annulations. Forewings somewhat dilated posteriorly, costa strongly arched, apex much rounded, hindmargin convex, rounded beneath, not oblique, inner margin sinuate; pale red irregularly suffused with fuscous, with numerous minute pale yellow spots; in posterior half these are arranged in longitudinal lines along the veins, which are slenderly outlined in fuscous between the spots; a fuscous line along costa to three-fourths, costal edge red; three larger pure white spots in disc at about one-fourth, and a fourth spot slightly beyond these; two lustrous silvery-white spots in costal portion of disc at three-fourths, one of these a small circular spot near costa, the other between this and centre of disc larger, oval, with long axis transverse, both finely outlined with deep red; a narrow fuscous hindmarginal line; cilia pale red with a pale fuscous median line, apices whitish-ochreous. Hindwings white faintly ochreous-tinged towards apices, cilia white.

Brisbane. One specimen taken by Dr. Lucas.

Palparia, *Wing.*

The following species of this genus have been taken in the neighbourhood of Brisbane :—

Palparia aurata, Walk.
" *uncinella*, Z.
" *semijunctella*, Walk.
" *pyroptis*, Meyr. (MSS.).
" *eonephela*, Meyr.
" *rectiorella*, Walk.

Palparia subrosea, n. sp.

Male, 25 mm. Head ochreous-fuscous. [Palpi broken.] Antennæ whitish-ochreous, ciliation in male 5. Thorax pinkish. Abdomen ochreous. Legs reddish-fuscous, tarsi fuscous, posterior tibiæ pinkish-grey. Forewings elongate, costa moderately arched, apex slightly produced, acute, hindmargin sinuate, very oblique; pale-red, irrorated with whitish-ochreous scales, especially along costa and hindmargin, where they replace the ground-colour; an ill-defined dark-fuscous line along posterior two-thirds of inner-margin; a dark-fuscous dot in disc before and a second after middle; cilia whitish-ochreous, at apex reddish, with a terminal fuscous dot. Hindwings as broad as forewings, whitish, towards apex rosy; cilia rosy, deeper at apex, becoming paler towards anal angle.

One specimen taken on Stradbrooke Island, Moreton Bay, by the late Mr. Boreham.

Though the palpi are unfortunately broken off, there can be no doubt as to the location of this species, which is allied to *Palp. eonephela*, Meyr., and *leucosta*, Lower.

Lepidotarsa, *Meyr.*

Lepidotarsa irioides, *Meyr.*

Brisbane; one specimen from *Casuarina* in October.

Lepidotarsa chryscrythra, n. sp.

Male, 16 mm. Head yellow, with a red spot on crown. Palpi, second joint basal two-thirds whitish, apical one-third reddish-fuscous; terminal joint ochreous. Antennæ ochreous. Thorax yellow, mottled with bright-red. Abdomen pale-ochreous. Legs ochreous, anterior tibiæ and tarsi red, mottled externally with yellow, internally with fuscous. Forewings moderate, costa slightly arched, hindmargin oblique; yellow, coarsely reticulated with bright-red, with alternate bars of yellow and red along hindmargin; a pale-yellow streak along costa from base to apex, its anterior three-fourths edged internally with fuscous; a broad fuscous line from base close to inner-margin, reaching margin at one-fourth, and continued along it to three-fourths; a broad fuscous streak from anal angle obliquely towards centre of disc, where it terminates in a fine point; cilia red, apices fuscous, at anal angle fuscous. Hindwings elongate-ovate; pale ochreous-whitish; cilia whitish.

A truly brilliant insect.

Brisbane; one specimen taken at light.

LEPIDOTARSA LEUCELLA, n. sp.

Male, 13 mm. Head, palpi, and antennæ white. Thorax white, finely irrorated with greyish-fuscous. Abdomen whitish. Legs white. Forewings white, faintly ochreous-tinged posteriorly; finely irrorated with greyish-fuscous; cilia ochreous-whitish. Hindwings and cilia ochreous-whitish.

Allied to *Lepid. alphitella*, Meyr., but without the discal dots.

Brisbane; one specimen beaten from ti-tree *(Melaleuca)* in October.

EOCHROIS, *Meyr.*

The following have been taken near Brisbane :—

Eochrois lætiferana, Walk.

I have reared this species from larvæ spinning together the phyllodes of *Acacia longifolia.*

Eochrois matutinella, Walk.

" *protophaës*, Meyr.

EOMYSTIS, *Meyr.*

This genus was founded by Meyrick on a species of which he captured one specimen at Albany, Western Australia. It is interesting to note that another species, apparently belonging to the same genus, is to be found in Southern Queensland.

EOMYSTIS ACRIBES, n. sp.

15-16 mm. Head yellow; face yellow with two orange dots. Palpi yellow, base of second joint orange. Antennæ whitish annulated with fuscous, basal joint orange. Thorax yellow coarsely reticulated with orange. Abdomen ochreous. Legs whitish, anterior pair dull reddish; anterior tarsi with yellow annulations; middle tibiæ purple-fuscous. Forewings moderate; costa strongly arched, apex rounded, hindmargin straight, oblique; bright yellow coarsely reticulated with reddish-orange; two narrow purple-fuscous fasciæ, first straight from one-third of costa to middle of hindmargin, second bent inwards in disc from two-thirds of costa to anal angle, both dilated on costa and inner margin; a purple-fuscous line along basal half of costa, and another along hindmargin from beneath apex to anal angle; cilia purple-fuscous. Hindwings ochreous; cilia ochreous, slightly fuscous-tinged at apex.

Brisbane. Two specimens.

EURYPELTA, n. g.

Head with appressed scales, side tufts moderate, spreading, meeting above. Antennæ in male rather stout, with very short fine ciliations (one-fourth), pecten absent. Palpi moderate, second joint slightly exceeding base of antennæ, thickened with

rough scales anteriorly. Thorax smooth. Forewings dilated, apex rectangular, hindmargin nearly straight. Abdomen broad. Forewings with vein 7 to hindmargin, 2 from somewhat before angle of cell. Hindwings normal.

Differs from *Eomystis* in the short ciliations of the antennæ, and from *Eclecta* in the absence of a thoracic crest.

EURYPELTA EPIPREPES, n. sp.

Female, 23 mm. Head and face ochreous-yellow. Palpi ochreous-yellow, anterior surface tinged with dull reddish. Antennæ whitish annulated with fuscous. Thorax ochreous-yellow with a purple fuscous spot on each side. Abdomen ochreous. Legs ochreous, anterior and middle tibiæ and tarsi annulated with reddish. Forewings strongly dilated, costa strongly arched, apex rectangular, hindmargin nearly straight, very slightly oblique; ochreous-yellow irrorated thickly with dull reddish, markings dull purple fuscous; a transverse fascia close to base, its posterior edge very irregular and ill-defined; a squarish blotch on costa at one-third confluent with basal fascia, and sending an irregular transverse line to inner margin; a larger blotch on costa at two-thirds, from which proceed two wavy lines, the anterior ending abruptly before reaching inner margin, the posterior to anal angle; between the anterior of these lines and the second fascia is an irregular suffusion of dull purple fuscous; hindmargin outlined with the same; cilia ochreous-whitish, bases purple tinged. Hindwings and cilia ochreous.

Gympie, Queensland. One specimen taken by Mr. Illidge.

HEMIBELA, n. g.

Head with appressed scale, side tufts erect, spreading. Antennæ moderate (ciliations in male unknown), with strong pecten. Palpi, second joint reaching base of antennæ, thickened towards apex anteriorly with slight rough scales; terminal joint very minute, pointed. Thorax smooth. Abdomen stout. Forewings somewhat elongate; apex acute, slightly produced. Forewings with vein 7 to hindmargin, 2 from slightly before angle to cell. Hindwings normal.

Probably allied to *Eochrois*, but at once distinguished from any other genus by the extremely minute third joint of palpi.

HEMIBELA TRISPORA, n. sp.

Female, 26-28 mm. Head and thorax dull fuscous grey. Palpi fuscous, terminal joint pinkish. Antennæ fuscous. Abdomen ochreous. Legs whitish tinged with vinous, except posterior tibiæ. Forewings elongate; costa moderately arched, apex acute, slightly produced; hindmargin sinuate, oblique; dull

fuscous grey, irrorated with whitish scales except at base; inner margin reddish-brown at base; three small circular spots in disc near base, ochreous-yellow outlined with reddish-brown; basal spot internal to fold, posterior and obliquely external to this lie the other two spots in a line with the first; hindmarginal edge tinged with purple; cilia pale reddish purple, on costa and anal angle fuscous. Hindwings uniform ochreous-yellow; cilia ochreous-yellow, on costa and towards anal angle tinged with fuscous.

A singular-looking insect, not resembling any other known to me.

Brisbane. Two specimens, both female, taken at light.

Euphiltra, *Meyr.*

I have two new species certainly referable to this genus. The antennal ciliations are $1\frac{1}{2}$ to 2.

Euphiltra thermozona, n. sp.

14-15 mm. Head white, sides of crown with a dark fuscous spot. Palpi white, extreme base of second joint dark fuscous. Antennæ dark fuscous. Thorax, anterior three-fourths black, sometimes containing two white spots; posterior fourth white. Abdomen fuscous, lateral margins and tuft ochreous. Anterior and middle tibiæ fuscous; tarsi ochreous-whitish; posterior tibiæ and tarsi ochreous-whitish. Forewings somewhat narrow; costa moderately arched, apex rounded, hindmargin very obliquely rounded; clear white; a triangular black spot at base of costa not reaching to inner margin; a moderately broad reddish-fuscous transverse fascia from two-fifths of costa to middle of inner margin, dilated towards inner margin; anterior edge concave, margined with fuscous; posterior edge convex, not margined; a second similar fascia of equal breadth from two-thirds of costa to anal angle, on costa and anal angle dark fuscous; anterior edge nearly straight, suffused; posterior edge sinuate, well defined. These two fascia are connected in disc by a short oblique fuscous line; an ill-defined triangular reddish-fuscous patch narrowly separate from hindmargin and second fascia, some scattered dark fuscous scales at apex and along hindmargin; cilia pale reddish-fuscous on costa and hindmargin, blackish-fuscous at apex and anal angle. Hindwings dark grey; cilia whitish-ochreous mixed with grey around apex.

Closely allied to *Euphiltra eroticella*, Meyr., but may be distinguished by the broader second fascia.

Brisbane. Three specimens.

Euphiltra angustior, n. sp.

12-14 mm. Head white. Palpi white, base of second joint

dark fuscous. Antennæ dark fuscous. Thorax white with two fuscous dots; shoulder tufts, anterior half fuscous, posterior half white. Abdomen ochreous-fuscous. Anterior and middle tibiæ and tarsi blackish-fuscous; posterior tibiæ and tarsi ochreous-whitish. Forewings somewhat narrow; costa slightly arched, apex rounded, hindmargin very obliquely rounded; white, a black spot at base of costa, not reaching inner margin; costal edge reddish-fuscous from base to first fascia; a transverse reddish-fuscous fascia from costa at two-fifths to middle of hindmargin, contracted on disc above middle, broadest on inner margin; it contains a few darker scales, but edges are not outlined; anterior edge concave, posterior edge sinuate; a very ill-defined ochreous fascia from costa at two-thirds to anal angle, thickly and irregularly irrorated with dark fuscous; a very ill-defined ochreous patch between second fascia and hindmargin, also irrorated with dark fuscous; a few dark fuscous dots on hindmargin; cilia ochreous. Hindwings grey; cilia whitish-ochreous tinged with grey.

Readily distinguishable from the other two species of the genus by its white thorax.

Brisbane. Three specimens.

Zonopetala, Meyr.

The following have been taken near Brisbane:—

Zonopetala divisella, Walk.
" *clerota*, Meyr.
" *decisana*, Walk.
" *glauconephela*, Meyr.
" *quadripustulella*, Walk.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

XV.

CARABIDÆ.

TACHYS.

T. brightensis, Blackb. This name appears to represent the same species as *Bembidium striolatum*, Macl.; though the conclusion could not be arrived at from Sir W. Macleay's description, I think there is no doubt of its being correct, as Mr. T. G. Sloane has recently sent me some examples of *B. striolatum* (named by comparison with the type), which are undoubtedly my *T. brightensis*. The insect certainly cannot be placed in *Bembidium;* it seems structurally to be a *Tachys* (or very close thereto) although, as I have previously remarked, belonging to a group of Australian species, that perhaps might with propriety receive a distinctive generic name.

SILPHIDÆ.

CHOLEVA.

C. antipodum, Blackb. I have received from Mr. Simson an example of *Choleva* taken in Tasmania, which I think must be referred to this species, although it is a little more elongate, and parallel in form, and considerably darker in colour. I take this opportunity to improve my description of the mesosternal keel in this insect, which I said (Trans. Roy. Soc. S.A., 1891, p. 87) "scarcely emerges forward from between the coxæ;" a more correct expression would have been "becomes very feeble in front of the coxæ."

LAMELLICORNES.

PALMERSTONIA.

P. minor, sp. nov. (Fem.) Nitida; valde convexa; picea, supra glabra, clypeo lævi; prothorace quam longiori dimidio latiori, grosse minus crebre punctulato; elytris vix manifeste 4-costatis, obsolete seriatim punctulatis, stria suturali leviter impressa; subtus (abdomine fere glabro excepto) longe minus dense hirsuta. Long., 8 l.; lat., $4\frac{1}{4}$ l.

The structural characters of this species seem to be quite the same as in *P. Bovilli*, Blackb., from which it may be at once distinguished by its much smaller size and coarsely punctulate prothorax; the coarse puncturation of the prothorax in contrast with the almost obsolete puncturation of the elytra and pygidium and the lævigate clypeus and scutellum gives the insect a very remarkable appearance. The propygidium (which is narrowly exposed) is opaque, and very finely strigose transversely; it is probably an organ of stridulation. The vertical clypeus (at a right angle with the hinder part of the head) and extraordinary labial palpi render this genus one of the most remarkable among the *Dynastides*.

N. Queensland; sent to me by Mr. French.

BUPRESTIDÆ.

STIGMODERA.

S. pictipes, sp. nov. (Mas.). Sat lata; minus convexa; flava, capite (nonnullorum exemplorum maculis quibusdam inter oculos exceptis) prothoracis disco basique scutello elytrorum basi summa antennis pedibus (femorum parte mediana excepta) prosterno medio mesosterni metasternique suturis maculisque nonnullis et coxarum maculis nonnullis aureo-viridibus, elytrorum fascia communi angusta postmediana et apice læte cœruleis; capite minus crebre vix fortiter (quam *S. tricoloratæ*, Waterh., minus crebre) punctulato, concavo; prothorace quam longiori duabus partibus (postice quam antice fere duplo) latiori, minus crebre minus fortiter (latera versus paullo magis crasse) punctulato, lateribus subtiliter crenulatis a basi circiter ad medium arcuatim divergentibus hinc ad apicem (vix sinuatim) convergentibus; elytris ad apicem late sinuato-subtruncatis (truncaturæ angulo interno vix producto, externo nullo), punctulato-striatis, interstitiis vix convexis sparsim minus subtiliter punctulatis, basi sinuata (vix manifeste angulata); corpore subtus (abdomine excepto) lanugine brevi argentea erecta vestito; sternis in medio sparsissime punctulatis; segmento ventrali apicali postice sinuatim truncato. Long., 14 l.; lat., $5\frac{1}{2}$ l.

Much resembles *S. tricolorata*, Waterh., but differs from that species (of same sex) by its form less convex and less narrowed behind, its head considerably less closely punctured, its prothorax much more evenly rounded on the sides (which are finely crenulate), its elytra having their base only *sinuate* (*i.e.*, wanting the angularity that is so well marked in *tricolorata* a little within the shoulder), their apex sinuately rounded without any spinose process whatever except a slight sutural projection and their interstices wider and flatter, its sterna much less closely punctured,

its green markings distinctly of a golden tone, its prothoracic green marking continuous to the front margin, its post median and apical elytral fasciæ much narrower, and its femora yellow on their under-surface (except a narrow edging of golden-green colour).

W. Australia; near York; presented to me by Mr. French.

S. Caroli, sp. nov. (Fem.). Minus lata; minus convexa; supra rufa, capite prothorace (hoc maculis 3 magnis rufis transversim positis ornato) et elytrorum basi summa apiceque summo æneoviridibus; subtus æneoviridis, abdominis segmentis ultimis 3 rufo-maculatis; capite vix concavo linea mediana longitudinali impresso; prothorace quam longiori paullo plus quam duabus partibus (postice quam antice duplo) latiori, crebre fortiter (latera et basin versus magis grosse minus crebre) punctulato, lateribus crenulatis fortiter rotundatis (latitudine majori pone medium posita), basi quam elytrorum basis sublatiori; elytris ad apicem rotundatis, punctulato-striatis, interstitiis sat convexis sparsim punctulatis, basi sinuatim truncata; corpore subtus latera versus confertim fortiter inæqualiter punctulato (hic illic vermiculato-ruguloso), parte mediana inæqualiter sculpturata (sc. prosterno antice transversim fortiter rugato, hoc postice metasterno et abdominis basi sparsim punctulatis); segmento ventrali apicali postice rotundato, ante apicem transversim depresso.

Var. elytris et prothoracis maculis pallide testaceis, illis pone medium macula transversa communi nigra ornatis.

Maris (exempli descripti) prothorace concolori obscure æneoviridi, segmentis ventralibus (basali antice et in medio excepto) totis testaceis, segmenti ultimi parte apicali carente. Long., 12—14 l.; lat., 5—6 l.

I have no doubt of the three specimens before me appertaining to one species only. They seem to have been taken in company with the preceding. I have described the female in preference to the male on account of the latter being a considerably damaged and broken example. I cannot specify any *Stigmodera* to which this insect is very closely allied, though it bears a general resemblance to several; perhaps it comes nearest to *Menalcas*, Thoms., but that species, besides considerable difference in colour, is of narrower and more convex form, more pilose on the under-surface, with its prothorax much less strongly rounded on the sides, &c. In both the female examples before me the prothorax bears a large testaceous or red spot on each side nearly touching the lateral margin, and a smaller one on the hinder part of the disc separated by only narrow intervals on either side from the larger spots. As Mr. French's surname has already been used by me for a *Stigmodera* that was described almost simultaneously, but a

little earlier, in Europe, I have called the present species after his Christian name, as so energetic a collector of the Australian *Buprestidæ* ought certainly to be commemorated in *Stigmodera*.

W. Australia; near York; presented to me by Mr. French.

S. oleata, sp. nov. (Mas.) Sat lata; minus convexa, nitida; cyaneo-nigra, elytris fascia communi sat lata ante-apicali læte sanguinea ornatis; capite leviter concavo, fortiter sat crebre punctulato; prothorace quam longiori tribus partibus (postice quam antice paullo plus quam duabus partibus) latiori, subtiliter sat sparsim (latera versus grosse rugulose) punctulato, lateribus anguste subdeplanatis (fere ut *S. Bonvouloiri*, Saund.) fortiter rotundatis, latitudine majori pone medium posita; elytris ad apicem rotundatis, punctulato-striatis, interstitiis sat convexis sparsim subtiliter punctulatis, basi sinuato-truncata; corpore subtus (abdomine excepto) lanugine brevi argentea erecta vestito; prosterno in medio sparsim subtiliter (latera versus confertim rugulose) punctulato; metasterno in medio sat crebre sat fortiter (latera versus confertim fortiter vix rugulose) punctulato; abdomine in medio sat sparsim (latera versus confertim rugulose) grosse punctulato; segmento ventrali apicali postice sinuatim truncato. Long., 11 l.; lat., 5 l.

Scarcely differs in respect of colour and marking from *S. Mniszechi*, Saund., but widely differs from it in almost every other character. Placed beside *S. Mniszechi* the present species is distinguished *inter alia multa* by the strongly rounded sides of its prothorax and the simply rounded apices, and regular striation of its elytra. Its shining surface causes it to appear as if it were polished with oil.

W. Australia; near York; presented to me by Mr. French.

S. oleata (?) (Fem.) Sat lata; minus convexa; nitida; supra ferrugineo-picea, prothorace obscuriori, hujus (parte basin versus excepta) elytrorumque lateribus aurantiacis; subtus nigra, vix cyanescens; segmento ventrali apicali rotundato, ante apicem transversim depresso; cetera ut *S. oleatæ* (maris). Long., 12—16 l.; lat., $5\frac{1}{4}$—$6\frac{1}{3}$ l.

Notwithstanding the extreme difference of colour and marking, I am disposed to believe that this is the female of the species whose male I have called *S. oleata*. I can discover no character on which to separate the two apart from their colour and markings, and f rom distinctions that are obviously sexual. I have seen three examples of this form (all females) and one of the other. They have all been forwarded to me by Mr. French as taken in the same locality (near York, W. Australia), and probably about the same time.

The females bear a considerable resemblance in colour to *S. flavocincta*, Lap., *S. pubicollis*, Waterh., and some others thereto allied, but differ entirely *inter alia* by the smooth nitid surface of the prothorax and the faint sparse puncturation of its disc. In all the females before me the orange border of the prothorax ceases abruptly a little in front of the base, so that the hinder part of the margin is of the colour of the disc.

S. unicincta, Saund. I believe this to be the male, and *S. flavicollis*, Saund., to be the female of one species.

CURCULIONIDÆ.

Gonipterini.

OXYOPS.

O. placida, sp. nov. (Fem.) Angustior; picea, squamis fulvis et nonnullis niveis (his maculatim dispositis) vestita, antennis pedibusque obscure rufescentibus; oculis minus prominulis; rostro lato brevi (ut *O. bilunaris*, Pasc.); prothorace vix transverso, a basi antrorsum leviter arcuatim angustato (fere subcylindrico), sat crasse ruguloso et granulis nitidis crebre adsperso; scutello sat elongato; elytris striato-punctulatis, puncturis sat magnis squamis fulvis repletis, interstitiis angustis crebre granulatis, humeris parum prominulis. Long., 4 l.; lat., 2 l.

The snowy-white scales are thinly and singly sprinkled on the prothorax, and form a patch on and around the scutellum, as well as some very conspicuous spots on the elytra, the largest of which are placed (one on each elytron) on the third interstice, a little behind the middle. The principal characters of this species seem to be:—Rostrum short and wide, without carinæ or sulci; prothorax elongate (to a casual glance longer than wide), without any distinct constriction or longitudinal sculpture, and with its front angles but little developed, coarsely rugulose, and covered with strong, shining granules; elytra evidently depressed on the space within the third interstice, and without tubercles (except the subapical nodosity which is not strongly developed), their shoulders but little prominent; mesosternum only moderately prominent in front.

Victoria; taken by Mr. Froggatt near Bendigo.

O. pictipennis, sp. nov. (Fem.) Angustior; rufa, nigro-variegata, squamis silaceis et nonnullis albidis vestita; oculis minus prominulis; rostro minus brevi minus lato; capite inter oculos profunde sulcato; prothorace leviter transverso, sat crasse ruguloso et granulis nitidis crebre adsperso, carina longitudinali mediana abbreviata instructo, lateribus a basi

antrorsum arcuatim convergentibus; scutello angusto; elytris striato-punctulatis, puncturis sat magnis, interstitiis sat angustis minus distincte granulatis, humeris parum prominulis. Long., 4 l.; lat., 2 l.

Not unlike the preceding in form and sculpture, but differing in several characters and in the colouring. The head and rostrum are black, the prothorax is dark-red, with the sides blackish, the elytra are dark-red, variegated with black, which forms irregular blotches. The antennæ are reddish, with the basal joint shining black, the legs red, more or less variegated with black, the under-surface black. The rostrum is markedly longer and narrower than that of the preceding species. The scales of the upper-surface are thinly, inconspicuously, and somewhat evenly distributed, and are slender and seta-like. The variegated colours of the derm render this species a conspicuous one. The mesosternum is distinctly, but not very strongly, prominent.

Victoria; taken by Mr. Froggatt near Bendigo.

ERIRHININI.

In part XIV. of this series of memoirs I expressed the intention of furnishing in this present part a tabulated statement of the distinctive characters of the Erirhinid genera known to be Australian. I regret exceedingly that it has proved impossible to carry out the intention in a fully satisfactory manner owing to difficulty in obtaining definite information about several of the imperfectly described genera of Mr. Pascoe. Under these circumstances, and in view of the need there is for a comprehensive treatise on these insects, I have thought it best to adhere to my intention of laying such a treatise before the Society, in spite of the knowledge that I may have wrongly identified some of Mr. Pascoe's genera, and that consequently the synonymy of my work may very probably have to undergo more or less correction eventually. At present the descriptions of the Australian *Erirhinini* are scattered through a multitude of memoirs, and are many of them extremely defective in character. The only attempt that has been made at a comprehensive treatment even of the genera consists in a tabulation published by Mr. Pascoe in the "Annals and Magazine of Nat. Hist." for 1872, dealing with only about two-thirds of the genera now known, including a number of genera that Mr. Pascoe afterwards stated he had erroneously located in the group, and dividing the group into sections, of some of which Mr. Pascoe himself said (perfectly correctly, I think) "they cannot be maintained satisfactorily, as some of the genera might be placed in either of them." That I have not succeeded in arriving at certainty in the identification of some of Mr. Pascoe's genera is not due to any carelessness or want of effort on

my part. Some years ago I procured Mr. Pascoe's consent to compare a collection of generic types from my collection with his own types, and in due course forwarded the collection to him, accompanied with a second collection which I offered for his acceptance. After an interval I received back from him the specimens I had marked to be returned, but the only information he furnished was a statement that only one (of which he furnished the name) of the species was known to him. When Mr. Pascoe's collection passed into the possession of the British Museum, I wrote proposing to exchange types of species and genera that I had myself named against examples of those species, of which there were several examples in Mr. Pascoe's collection, and was informed that there were not many specimens of most of the species I desired, and that the proposal could not be accepted. There was nothing more to be done, for the offer to compare specimens I might send with Mr. Pascoe's types did not meet the difficulty; inasmuch as such a comparison would be unreliable unless made by someone who should be able to devote more time to minute examination of characters than it was to be expected the curators of the Museum could have at their disposal, and who at the same time should be familiar as a specialist with the distinctive characters of the Australian *Erirhinini*.

I am afraid Australian workers must make up their minds to the fact that if they are to postpone describing the insects of their country until they have ascertained them to be new by comparison with types (in the case of genera or species that have been insufficiently described in Europe) they will have to leave the work almost entirely to be done outside Australia. For my own part, I am convinced that the best course to adopt is to regard all descriptions that are insufficient for recognition as non-existent (unless one can get at the types through one's own friends), and although unquestionably the result will often prove to be that one's nomenclature will have to be subsequently corrected, I regard the author of the original insufficient description as the person on whom must be laid the responsibility for any confusion that may occur.

Returning to the subject of the Australian *Erirhinini*, the number of genera (including those I characterise in the present memoir, and excluding those originally attributed to the group by Mr. Pascoe, but subsequently removed from it by their author) is 48. Two species have been described (by Schönherr and Bohemann) as belonging to the genus *Erirhinus*; but this may be confidently regarded as an erroneous nomenclature, and therefore I do not consider that there is any ground for including *Erirhinus* among our Australian genera. Of the 48 genera, I have characterised 14 myself, four are Schönherr's, and two are

Erichson's. The remaining 28 are Pascoe's. Among these there are only five (all of them Pascoe's) that I am not able to assign a place in a tabular arrangement; for which comparatively satisfactory state of things I am largely indebted to Mr. G. Masters, of Sydney, who furnished Mr. Pascoe with a large proportion of the specimens on which he founded his genera, and having retained examples in his own collection, has generously placed them in my hands during the time that I have been working on the present memoir. As the diagnoses of the five genera that I have been unable to identify are quite insufficient for distinction from the diagnoses of other genera, it is quite possible that I may have re-named some of them; nevertheless, as they all happen to have been founded on species from W. Australia, and none of my new genera are founded on W. Australian species, the probability is that they all represent forms that have not come under my notice. Although their characters are not sufficiently indicated by Mr. Pascoe to enable me to assign these genera a place in a general tabulation of the group, I have nevertheless been able to place them, on the strength of the few characters that their author mentions, in a short separate tabulation that I have drawn up. Subject to the remarks that will be found further on regarding the genus *Xeda*, I may add that the two tabulations I supply may be relied on absolutely as far as they go, for in the case of every genus that I have tabulated the characters have been taken either from an authentic type or from the author's own diagnosis. In no case have I introduced into the tabulation characters passed over by the author in silence unless I have had an authentic type before me. The name that would be assigned to any specimen by comparison with the tabulation is the generic name of that species, subject only to the inevitable condition that it may be a species requiring a *new* generic name on the ground of its differing from the type of the genus in respect of some character that is mentioned neither in the tabulation nor in the author's diagnosis.

There are several terms made use of in the tabulation that it is desirable to explain clearly. The first is the term "quadrangular" as applied to the rostrum; it signifies that the rostrum differs from the ordinary form (more or less cylindric) of that organ through its sides being abruptly vertical and thus at right angles to the upper surface. The next term is "subapical," or "submedian," or "subbasal" as applied to the scrobe of the rostrum, and which refers to the *front extremity* of the scrobe. The third term requiring definition is "divergent" or "divaricate" as applied to the claws, the former meaning that the dorsal border of each claw holds a direction *at right angles* to the direction of a longitudinal line passing down the tarsus (as in the

Longicorn genera *Zygocera* and *Hebesecis*); the latter meaning that the dorsal border holds a direction more or less *continuing* the direction of the supposed longitudinal line.

Among the genera that I have tabulated there are two regarding the identification of which I feel that there is an element of doubt, and it seems necessary to indicate these genera and specify the reasons of the doubt in each case. The first is *Xeda*. I cannot say that I feel any *genuine* doubt about this, inasmuch as *X. amplipennis*, Pasc., is among the types lent me by Mr. Masters, and it agrees so perfectly with Mr. Pascoe's specific description and with his generic diagnosis in respect of all characters but one as to convince me that it is rightly named; but, nevertheless, its claws are divergent, whereas Mr. Pascoe calls them divaricate. I am of opinion that Mr. Pascoe probably did not use these terms exactly in the technical sense of Lacordaire, but interpreted "divaricate" as meaning "very widely," and "divergent" as meaning "less widely" directed apart. In most cases this interpretation would lead to the same results as M. Lacordaire's. Moreover, it is to be noticed that the claws are very easily forced into an unnatural condition in mounting, and that for confidence in deciding whether the claws of a specimen are divergent or divaricate it is necessary to be sure that they are not artificially displaced. The second genus which calls for remark is *Cyttalia*. The species that I have attributed to that genus depart from the characters specified by Mr. Pascoe in two respects: their femora are all dentate, whereas, according to the diagnosis, the hind femora only should be dentate; and their claws are divaricate, whereas they should be divergent. As regards the latter discrepancy, the remarks I have made above in respect of *Xeda* may perhaps apply here; and in regard to the former discrepancy I do not regard the exact number of dentate femora as important enough to be a generic character; indeed, Mr. Pascoe himself, in the case of the *Anthonomid* genus *Diapelmus*, does not hesitate to assign to it species that depart similarly from the characters assigned by its author. It is, I think, at any rate certain, that if the species I have called *Cyttalia* are not really congeneric with that on which the genus was founded, they cannot be referred to any other characterised genus, and therefore no great harm will result from their temporary location under a name that they are not really entitled to bear. The most remarkable character of *Cyttalia* I take to be the elongation of the antennal scape to the extent of its reaching back to the hind margin of the eye, and this character is present in the species I have assigned to the genus.

It is desirable to take this opportunity of referring to those species that I have previously described regarding which I have

been led to modify my opinion by the fuller study of the *Erirhinini* that I have made for the purposes of this memoir. I am now strongly convinced that the character of the claws is of the first importance in this group; from which it results that two species which in the Proc. Linn. Soc., N.S.W., 1892, p. 147, I attributed to *Myossita*, having divaricate claws, cannot, in my opinion, rightly remain under that name. One of them *(M. munda)* is undoubtedly congeneric with the species that I attribute in this memoir to *Cyttalia*; the other *(M. crucigera)* I hesitate to place in *Cyttalia* on account of its antennal scape being too short and its general form too robust for that genus. I should treat it as the type of a new genus were it not that it agrees fairly with the characters Mr. Pascoe assigns to *Agestra*, but as the diagnosis of *Agestra* contains no reference to the claws, I am barred from calling it an *Agestra*. Consequently, I wish I had not described it, but as that, unfortunately, is a futile wish, I can only suggest that it be placed under *Agestra*, with the note added to its name, "? huj. gen." The third species on which I have to remark is that which I described in Proc. Linn. Soc., N.S.W., 1890, p. 584, as *Agestra punctulata*, expressing at the time grave doubt as to its real place. It is a very remarkable insect, for which a new generic name must be provided, but as I have satisfied myself by a microscopic examination that its claws are not really simple, I think, in spite of its *Erirhinid* facies, it must come out of the *Erirhinini* altogether, and I shall therefore reserve its fuller treatment for a memoir I hope to offer to the Society at an early date, dealing with it and some other allied forms of minute *Curculionidæ*, which at present I am unable to assign to any of M. Lacordaire's "tribes."

The following is a tabulation of the characters of all the *Erirhinid* genera as yet recorded as occurring in Australia, with the exception of five imperfectly characterised genera, of which I have been unable to procure the opportunity of examining a type, and which, therefore, I have placed in a separate tabulation :—

A. Tarsi not linear.
  B. Funicle of antennæ 7-jointed.
    C. Tarsi 4-jointed.
      D. Femora unarmed.
        E. Eyes distinctly on the head, as distinguished from the rostrum.
          F. Scrobes connivent.
            G. Ocular lobes distinct... ... ... Aoplocnemis.
            GG. Ocular lobes wanting ... ... Symbothinus.
          FF. Scrobes not connivent.
            G. Front tibiæ falcate.
              H. Basal joint of hind tarsi elongate; elytra not setose ... ... Œnochroma.

HH. Basal joint of hind tarsi not elongate; elytra clothed with long erect setæ ... ... Olbiodorus.
GG. Front tibiæ not falcate.
H. Rostrum quadrangular.
I. Tibiæ mucronate at apex ... ... Plæsiorhinus.
II. Tibiæ not mucronate at apex ... Nemestra.
HH. Rostrum not quadrangular.
I. Scrobes subapical; joint 4 of tarsi equal to 1-3 together.
J. Rostrum constricted at base ... Anorthorhinus.
JJ. Rostrum not constricted at base Desiantha.
II. Not having both subapical scrobes, and joint 4 of tarsi as long as 1-3 together.
J. Front tibiæ not bicalcarate at apex.
K. Claws divergent.
L. Eyes finely granulate.
M. Scrobes lateral, submedian.
N. Rostrum elongate ... Paryzeta.
NN. Rostrum short ... Xeda
MM. Scrobes abruptly turned under rostrum.
N. Elytra smooth ... Olanæa.
NN. Elytra tuberculate ... Rhachiodes.
MMM. Scrobes subbasal ... Glaucopela.
LL. Eyes coarsely granulate
M. Basal joint of funicle not or little longer than 2nd joint ... ... Gerynassa.
MM. Basal joint of funicle much longer than 2nd joint.
N. Ocular lobes present ... Ethas.
NN. Ocular lobes wanting ... Omorophius.
KK. Claws divaricate.
L. Elytra not, or but feebly, bisinuate at base.
M. Eyes finely granulate.
N. Prothorax rounded at base.
O. Ocular lobes present ... Cydmæa.
OO. Ocular lobes wanting Dicomada.
NN. Prothorax bisinuate at base ... ... Erytenna.
MM. Eyes coarsely granulate.
N. Antennal club elongate, very distinctly articulate.
O. Apical ventral segment shorter than 2nd segment.
P. Apical joint of tarsi strongly exserted Epacticus.
PP. Apical joint of tarsi but little exserted ... Encosmia.

OO. Apical ventral segment longer than 2nd segment.
P. Front of prosternum evenly emarginate — Eniopea.
PP. Front of prosternum very strongly emarginate in the middle ... — Empolis.
NN. Antennal club short, compressed, indistinctly articulate.
O. Front of prothorax (viewed from the side) strongly sinuous — Emplesis.
OO. Front of prothorax (viewed from the side) straight ... — Epamœbus.
LL. Elytra very strongly bisinuate at base ... — Themelia.
JJ. Front tibiæ bicalcarate at apex... — Hedyopis.
EE. Eyes as much on rostrum as on head ... — Phrenozemia.
DD. Femora (at least the hind femora) dentate.
E. Scape of antennæ not or scarcely passing the front of the eye.
F. Apical joint of tarsi more or less strongly exserted.
G. Prosternum normal.
H. Eyes finely granulate.
I. Scrobes connivent, or nearly so ... — Orpha.
II. Scrobes not nearly connivent.
J. Basal joint of tarsi very elongate... — Meriphus.
JJ. Basal joint of tarsi normal ... — Myossita.
HH. Eyes coarsely granulate ... ... — Agestra.
GG. Prosternum concave ... ... — Storeus.
FF. Apical joint of tarsi not (or scarcely) exserted ... ... — Cryptoplus.
EE. Scape of antennæ reaching the back of the eye... ... ... — Cyttalia.
CC. Tarsi 3-jointed ... ... — Thechia.
BB. Funicle of antennæ 6-jointed.
C. Tarsi 4-jointed.
D. Apical joint of tarsi well exserted.
E. Front tibiæ mucronate ... ... — Antyllis.
EE. Front tibiæ simple ... ... — Dyschænium.
DD. Apical joint of tarsi scarcely exserted.
E. Rostrum long and slender ... ... — *Endalus.
EE. Rostrum short and stout (not longer than prothorax) ... ... — Niphobolus.
CC. Tarsi 3-jointed ... ... — Misophrice.
BBB. Funicle of antennæ 5-jointed... ... ... — Anarciarthrum.
AA. Tarsi linear ... ... — Bagous.

---

*It is doubtful whether this genus is really Australian (*vide* Tr. Roy. Soc. S.A., 1893, p. 315).

Tabulation of Erirhinid genera not included in the general tabulation preceding :—

A. Femora unarmed.
  B. Scrobes not abruptly turned under the rostrum.
    C. Eyes finely granulate.
      D. Joint 2 of funicle short ... ... Nedyleda.
      DD. Joint 2 of funicle long ... ... Methone.
    CC. Eyes coarsely granulate ... ... Empira.
  BB. Scrobes abruptly turned under the rostrum ... Phædica.
AA. Femora dentate (at any rate the hind femora) ... Clisis.

SYMBOTHINUS.

S. nasutus, sp. nov. Elongatus, valde angustus; totus ferrugineus, squamis albidis plus minusve manifeste vestitus; rostro sat robusto, ad basin subito arcuato, quam prothorax parum longiori, sat fortiter punctulato et longitudinaliter lineis elevatis subtilibus instructo; capite prothoraceque sat crebre sat fortiter punctulatis; hoc vix transverso, antice posticeque angustato, lateribus modice arcuatis; elytris vix striatis, striis sat fortiter punctulatis, interstitiis subplanis; tarsorum articulo 3° sat dilatato, 4° minus exserto. Long. (rostr. incl.), $1\frac{2}{5}$ l.; lat., $\frac{2}{5}$ l.

About the most narrowly elongate *Erirhinid* known to me; the rostrum has a very peculiar curve at the base, of which a good idea may be formed from the figure of the rostrum of *Agnesiotis pilosula*, Pasc. (Journ. Linn. Soc., x. t. 18, fig. 6a), although of course the rostrum of *A. pilosula* has no resemblance in other respects to that of the present species. The unique example before me is but sparsely clothed with scales, those of whitish color lying chiefly along the suture of the elytra, but it is quite possible that a fresher specimen would be more densely scaly.

S. Australia; I do not know the exact habitat.

PARYZETA.

P. vittata, sp. nov. Ovalis; ferruginea, squamis concoloribus et nonnullis albidis vestita; his in capite condensatis, et in prothorace vittas 2 latas in elytrisque vittas plurimas (sc. in interstitii 5^{i} parte postica, in interstitii 6^{i} parte antica, in suturæ parte postica, et utrinque vittam obliquam ab humero versus suturam directam) formantibus; rostro (feminæ) quam prothorax fere duplo longiori, arcuato, ad basin compresso, subtiliter punctulato, apicem versus fere lævi; prothorace vix transverso, antice fortiter angustato, crebre sat fortiter punctulato, lateribus sat rotundatis; elytris punctulato-striatis, interstitiis sat planis punctulatis; antennarum funiculi articulo 2° quam 1us multo breviori, quam 3us sat longiori. Long. (rostr. incl.), 2 l.; lat., $\frac{1}{2}$ l.

I have not seen an authentic type of this genus, but this species agrees well with Mr. Pascoe's generic diagnosis, except in its rostrum being very evidently compressed at the base (possibly only in the female), which is a character not mentioned by Mr. Pascoe. The elytra of the present species are at their widest at the base, where they are about half again as wide as the base of the prothorax, and whence they are narrowed hindward.

W. Australia; taken by E. Meyrick, Esq., near Albany.

OLANÆA.

O. metropolitana, sp. nov. Ovalis; ferruginea, antennarum clava et (versus apicem) tarsis infuscatis; squamis concoloribus et nonnullis albidis vel albido-viridibus vestita; his in prothorace trivittatim et in elytris ut vittæ plurimæ abbreviatæ (vitta suturali magis conspicua magis continua) condensatis; rostro (maris) quam prothorax fere sesquilongiori, sat cylindrico, leviter arcuato, punctulato, apicem versus fere lævi; prothorace sat transverso, antice modice angustato, ad apicem transversim depresso, crebre minus fortiter ruguloso, lateribus leviter rotundatis; elytris punctulato-striatis, interstitiis sat planis punctulatis; antennarum funiculi articulo 2° quam 1us multo breviori, quam 3us haud multo longiori. Long. (rostr. incl.), 2 l.; lat., $\frac{3}{5}$ l.

The white or greenish scales on the elytra of this species form numerous short longitudinal lines, that on the suture being the most conspicuous and most continuous.

N.S. Wales; taken near Sydney by Mr. Lea.

O. mentitrix, sp. nov. Ovalis; sat elongata; ferruginea, corpore subtus picescenti, nonnullorum exemplorum antennarum funiculo plus minusve infuscato; squamis albidis subtus dense æqualiter, supra subvittatim, vestita; setis erectis albis et nonnullis nigris sat sparsim instructa; rostro quam prothorax (maris parum, feminæ sat multo) longiori, leviter compresso, leviter arcuato, punctulato, longitudinaliter striolato, lateribus pone medium sulcos (his scrobes simulantibus) ferentibus; prothorace vix transverso antice parum angustato, lateribus sat rotundatis; elytris punctulato-striatis, interstitiis sat planis punctulatis; antennarum funiculi articulis 1° 2° que elongatis, hoc quam illo sat breviori. Long. (rostr. incl.), 2 l.; lat., $\frac{7}{10}$ l.

I refer this species to *Olancea* as having (in combination with the general characters of *Xeda* and its allies) rostral scrobes abruptly directed to the underside of the rostrum. Nevertheless, it differs from the previously described *Olancæ* in having a lateral furrow on either side of the rostrum (not unlike that of *Erytenna*), which at the first glance might be mistaken for the

scrobe. The rostrum, moreover, is somewhat too long and compressed for an average *Olanœa*. The general resemblance to *O. nigricollis*, Pasc., is so close that it would be difficult to determine an example of either if it had lost its rostrum except by the colour of the prothorax.

Victoria; Alpine district.

XEDA.

X. magistra, sp. nov. Robusta; sat parallela; picea, antennis pedibusque rufis; squamis ferrugineis albidisque intermixtis vestita; rostro quam prothorax vix longiori, punctulato, longitudinaliter leviter striolato; funiculi articulo basali quam sequentes 2 conjuncti subbreviori; prothorace fortiter transverso, antice valde angustato, sat crebre minus fortiter punctulato, lateribus fortiter arcuatis; elytris punctulato-striatis, interstiitis sat crebre sat subtiliter punctulatis, leviter convexis. Long. (rostr. incl.), $2\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

My example of this species is somewhat abraded. It is, nevertheless, apparent that a fresh example would be uniformly covered with fine ferruginous scales, thickly and somewhat evenly sprinkled with fine whitish scales, which, however, are a good deal condensed on the sides of the prothorax. The prothorax is extremely small in proportion to the size of the elytra.

S. Australia.

X. notabilis, sp. nov. Late ovalis; nigra, antennis (clava plus minusve infuscata excepta) tibiis tarsisque ferrugineis squamis (supra nigris, nonullis ferrugineis nonnullis albidis maculatim intermixtis, subtus albidis) dense vestita, et setis subtilibus sat brevibus suberectis instructa; rostro quam prothorax vix longiori, sat crasse punctulato et longitudinaliter striolato; funiculi articulo basali quam sequentes 2 conjuncti sat longiori; prothorace ut præcedentis sed magis fortiter punctulato; elytris punctulato-striatis, interstitiis punctulatis vix convexis. Long. (rostr. incl.), $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The black scales form the ground of the upper surface, and are sparsely and inconspicuously mottled with ferruginous scales. The whitish scales form conspicuous and well-defined markings, which consist of a basal spot on either side of the prothorax, and on the elytra a number of small patches limited to the interstices of the striæ, and grouping themselves into the following markings:—*(a)* A large spot around the scutellum running backward on the suture, and giving off at its hind extremity a narrow fascia on either side a little in front of the middle; *(b)* a narrow zigzag and more or less interrupted fascia a little behind the middle. The white scales on the elytra vary in extent; in some

individuals those on the front part being so extended as almost to cover the basal half of the surface.

N.S. Wales; taken by Mr. Lea at Whitton.

RHACHIODES.

R. strenuus, sp. nov. Sat latus; fere subquadratus; piceus, rostro antennis pedibusque rufescentibus; squamis vestitus (his in elytrorum parte antica griseis, in parte postica fulvis, in spatio intermedio laterali triangulari albis); prothorace transverso crebre subtiliter ruguloso et sparsim granulato, haud tuberculis majoribus munito; elytris punctulato-striatis et tuberculis quinis fasciculatis ornatis (sc., 2 in interstitio 2°, 1 in 4°, 2 in 5°). Long. (rostr. incl.), $3\frac{2}{5}$ l.; lat., $1\frac{2}{5}$ l.

A rather short, wide and quadrate species, very distinct by its prettily-arranged squamosity. Regarding the grey scales as forming the ground-colour, the markings consist of bright fulvous scales clothing the front and sides of the prothorax and the apical one-third of the elytra, and a somewhat triangular patch of white scales on each elytron having its base about the middle of the lateral margin. The prothorax is devoid of tubercles, but a number of small granules are scattered confusedly over its surface. On the elytra there is a good-sized fasciculated tubercle on each side of the suture scarcely in front of its middle, another of about equal size near the apex of the fifth interstice, a very small one (scarcely more than a granule) in the front part of the fifth interstice, and two of moderate size on each elytron (on the second and 4th interstices respectively) a little behind the anterior of the two larger tubercles, forming with their fellows of the other elytron a continuous curved transverse series. The outward-directed prominence of the elytra below the shoulder is feebler than in most others of the genus.

N. Queensland.

R. forcipatus, sp. nov. Modice elongatus, elytris sat parallelis; piceus antennis pedibusque rufescentibus; squamis griseis sat æqualiter vestitus; prothorace vix transverso, crebre subtiliter ruguloso sparsim granulato, tuberculis 4 transversim positis munito; elytris punctulato-striatis et tuberculis quinis (ut speciei præcedentis positis) ornatis, angulo subhumerali fortiter prominenti. Long. (rostr. incl.), $2\frac{4}{5}$ l.; lat., 1 l.

This little species is nearer to *R. dentifer*, Bohem., than to any other described species, with which it agrees in the number and general arrangement of the tubercles on the prothorax and elytra, except as follows:—In both species the three tubercles placed on the middle part of each elytron may be regarded as enclosing with their fellows on the other elytron a common discal space which in *dentifer* is transversely oval, and in this species almost

circular. This species also is smaller than *dentifer*, and its elytra are considerably less narrowed from the base hindward, being almost parallel; also the large subapical tubercles of the elytra are more erect and are distinctly curved in shape, their apices being directed towards each other; neither have I seen any example of *dentifer* in which the squamosity of the upper surface is of a uniform grey colour, as it is in my unique example of this insect. *R. multidentatus*, Chevr., from Tasmania, is described (in spite of its name) as having only *four* tubercles on each elytron, and as being very differently coloured from the present species. I think a *Rhachiodes* from Tasmania sent me by Mr. Simson is almost certainly *multidentatus*, but as it is open to doubt it is better not to mention other characters than those specified in Chevrolat's description.

N.S. Wales; Tweed R.

GLAUCOPELA.

G. fusco-marmorea, sp. nov. Ovalis; minus lata; picea, rostro antennis pedibusque (his, præsertim femoribus, plus minusve ænescentibus) testaceis; squamis albidis et nonnullis nigro-fuscis variegatis dense vestita (squamis nigro-fuscis in prothorace vittas latas 2 et in elytris maculas incertas formantibus); rostro quam prothorax subbreviori sublævi parum subulato; prothorace leviter transverso antice fortiter angustato; elytris punctulato-striatis, interstitiis sat planis. Long. (rostr. incl.), $1\frac{1}{5}$ l.; lat., $\frac{1}{2}$ l.

This genus is easily recognisable among the Australian *Erirhininæ* by its subbasal scrobes. The present species may be at once distinguished from *G. unicolor*, Pasc., by its testaceous antennæ and from *G. varipes*, Blackb., by its smaller size, evidently narrower build, and different colors and markings. In *G. varipes* the upper surface is evenly (though not very closely) clothed with shining whitish scales, and has no pattern, while in the present species the whitish scales are of an opaque tone, and are so intermingled with blackish scales that there is a very distinct though very variable pattern, consisting of two wide dark vittæ on the disc of the prothorax, and a number of smaller or larger dark spots or blotches (in some examples exceeding the lighter coloring in extent) dispersed over the elytra.

N.S.Wales; taken near Sydney by Mr. Lea.

G. distincta, sp. nov. Præcedenti valde affinis; minus parallela; squamarum pallidiorum colore magis viridi, his magis nitidis; corpore supra setis subtilibus sat elongatis fulvis sat sparsim ornato; prothorace sat fortiter transverso. Long. (rostr. incl.), $1\frac{1}{2}$ l.; lat., $\frac{7}{10}$ l.

As I have seen only two examples of this insect, and the

species is very likely to be variable in the arrangement of its squamosity, it is useless to describe the pattern very minutely ; in general the markings resemble those of the preceding species, but are much less clearly defined, and the lighter colored scales are more nitid, and have a distinctly greenish tone. The insect may, however, be at once distinguished from all other previously described Australian *Erirhinini* by the following characters in combination : antennæ testaceous, scrobes subbasal, upper surface clothed with fine hairs of a bright fulvous color (in addition to the scales).

N.S. Wales ; taken by Mr. Lea at Whitton.

ETHAS (gen. nov. *Erirhininarum*).

Corpus squamosum ; rostrum elongatum (maris quam feminæ brevius), gracile, arcuatum ; scrobes laterales, fere rectæ, (maris multo feminæ vix) ante medium rostrum positæ ; scapus oculum vix attingens ; funiculus 7-articulatus ; oculi ovales minus fortiter granulati ; prothorax subcylindricus, basi leviter vel vix bisinuata, lobis ocularibus bene determinatis ; scutellum minutum ; elytra quam prothorax sat latiora ; prosternum antice fortiter emarginatum, ante coxas sat elongatum ; coxæ intermediæ approximatæ ; femora mutica ; tibiæ anticæ intus ad apicem breviter mucronatæ ; tarsorum articuli basales 3 minus elongatæ, ex ordine latiores, 3° bilobo, 4° modico sat exserto ; unguiculi divergentes ; segmentum ventrale 2um quam 3um 4um que conjuncta (et quam ultimum) vix longius.

The granulation of the eyes in this genus is somewhat intermediate in degree of coarseness, being evidently less coarse than in *Emplesis*, *Gerynassa*, &c., but not so fine as in *Cydmœa* and its allies. On the whole I think the genus is best placed with those having the eyes *coarsely* granulated. The following characters in combination (without regarding the eyes) will distinguish it from most if not all the other named Australian *Erirhinid* genera :—2nd joint of funiculus scarcely longer than 3rd, ocular lobes prominent, claws divergent. The rostrum is much like that of *Dicomada*.

E. varians, sp. nov. Ovalis (sat late) ; piceus, rostro pedibusque plus minus ve rufescentibus ; squamis fumosis et nonnullis albidis confuse intermixtis vestitus ; rostro quam prothorax (maris plus quam paullo, feminæ permulto) longiori, gracili, arcuato, supra longitudinaliter carinato ; funiculi articulo basali quam 2us multo longiori et crassiori, hoc quam 3us vix majori ; prothorace quam latiori fere longiori, albido trivittato, antice modice augustato, lateribus modice rotundatis ; elytris punctulato-striatis, interstitiis sat planis. Long. (rostr. incl.), $1\frac{3}{5}$ l. ; lat., $\frac{1}{2}$ l.

Remarkably like *Cydmæa diversa*, Blackb., but at once distinguishable from that species by its claws being (not divaricate, but) divergent. All the examples that I have seen are closely scaled and present the appearance of a smoky-black surface confusedly and somewhat variably mottled with whitish. On the prothorax the whitish scales generally form three fairly well-defined vittæ, and the scales of the under surface are entirely whitish. The sculpture of the prothorax and elytra (except the elytral striæ) is entirely hidden by squamosity.

Victoria; sent by Mr. French; examples from Sydney (Mr. Lea) seem quite identical.

E. eruditus; sp. nov. Præcedenti affinis; minor; minus latus; squamis albidis in elytris versus apicem condensatis et signaturam communem literam V simulantem (hac ab humeris ad suturam mediam extensa) formantibus. Long. (rostr. incl.), $1\frac{2}{5}$; lat., $\frac{2}{5}$ l.

The distinct pattern formed by the scales on the elytra (which do not seem at all possibly a mere variation of the marks of the preceding species), together with a manifest difference in size and build, satisfy me that this is a good species. The extremities of the arms of the V-like mark on the elytra touch the shoulders, while the apex rests on the suture at about its middle.

N.S. Wales; near Sydney.

OMOROPHIUS (gen. nov. *Erirhininarum*).

Corpus sqamis parvis adpressis dense vestitum; rostrum sat gracile valde elongatum, arcuatum, nitidum, subcylindricum, supra sparsim punctulatum, vix strigatum; scrobes submedianæ laterales; scapus oculum attingens; funiculus 7-articulatus; oculi grosse granulati; prothorax parvus leviter transversus, basi subtruncata, lobis ocularibus nullis; scutellum minutum; elytra quam prothorax multa latiora, ovalia; prosternum antice emarginatum, ante coxas modice elongatum; coxæ intermediæ inter se approximatæ; femora mutica; tibiæ anticæ vix mucronatæ; tarsorum articuli basales 2 sat breves (2° quam 1us breviori), 3° alte bilobo, 4° quam ceteri conjuncti vix breviori; unguiculi divergentes; segmenta ventralia 3um 4um que conjuncta quam 2um sublongiora, ultimo sat brevi.

This genus is near *Gerynassa*, but differs from it *inter alia* by the much longer claw-joint of the tarsi, the much longer rostrum, and much shorter second joint of the funiculus.

O. seriatus, sp. nov. Ferrugineus, rostro (nonnullorum exemplorum) antennarum clava et unguiculis infuscatis; squamis pallide fulvis et nonnullis albis vestitus; rostro (feminæ) quam prothorax duplo longiori; antennis modicis, funiculi

articulo basali quam sequentes 3 vix breviori; prothorace vix transverso, subquadrato, antice leviter angustato, supra sat crebre sat subtiliter rugulosa, lateribus parum arcuatis; elytris punctulato-striatis, interstitiis subcostatis setis brevibus albis adpressis seriatim ornatis. Long. (rostr. incl.), $2\frac{1}{2}$ l; lat., 1 l.

The upper surface is very uniformly clothed (in the examples before me) with small, close-set, inconspicuous pale fulvous scales, the sides of the prothorax and the shoulders, however, bearing scales that are somewhat conspicuously more pallid than those of the general surface. The scales of the under surface are whitish. The shape and general facies of this insect recall *Xeda* to the mind; the rostrum, however, is very different, the eyes are coarsely granulate, the prothorax is much narrower at the base than the elytra and not much narrowed in front, the claw-joint of the tarsi much longer, &c.

N.S. Wales; taken by Mr. Lea near Gosford.

CYDMÆA.

C. mixta, sp. nov. Sat late ovalis; picea, antennis tibiis tarsisque plus minusve rufescentibus; squamis fulvis albidisque intermixtis vestita; rostro quam prothorax (maris vix, feminæ manifeste) longiori, minus compresso; funiculi articulo 1° quam 2us multo longiori; prothorace leviter transverso; elytris punctulato-striatis, interstitiis vix convexis. Long. (rostr. incl.), $1\frac{2}{5}$ l.; lat., $\frac{3}{5}$ l. (vix).

The arrangement of the scales in this species are (as usual in the Australian *Erirhinini)* fairly constant in colour, but variable in arrangement. In all the specimens I have seen (taken by Mr. Lea and myself) the fulvous and white scales are so arranged as to present the appearance of the fulvous scales forming the ground and the whitish scales being condensed in the form of small spots rather closely and evenly distributed over the upper surface—in some examples without any more pattern-like arrangement, in others running into irregular ill-defined transverse series (especially on the hinder part of the elytra).

This species somewhat resembles *crassirostris*, Blackb., but is of somewhat narrower build, with a much less compressed rostrum, more reddish antennæ and tibiæ, and very different markings.

N.S. Wales; in the neighborhood of Sydney.

ENCOSMIA.

E. cornuta, sp. nov. Minus elongata; ferruginea, squamis silaceis plus minusve vestita; rostro quam prothorax vix longiori, punctulato; funiculi articulis basalibus 2 sat elongatis (basali

quam 2us sat longiori), ceteris brevibus ; prothorace vix transverso, antice sat angustato, supra crebrius ruguloso, lateribus sat arcuatis ; elytris punctulato-striatis, interstitiis subplanis crebre subtilius rugulosis, interstitio 3° postice tuberculo magno conico nigro armato. Long. (rostr. incl.), $2\frac{1}{2}$ l. ; lat., 1 l.

I place this species in *Encosmia* with considerable hesitation on account of its great difference in facies from the previously described species of the genus, compared with which it is a much larger and more robust insect, having a large tubercle on each elytron at the summit of the posterior declivity almost as in *Rhachiodes*. To a casual glance it has much the appearance of a *Rhachiodes*, but its divaricate claws, and eyes comparatively coarsely granulate, at once separate it from that genus. In structural character I can find no distinction from *Encosmia*. I have not described in detail the arrangement of the pale reddish scales with which it is clothed, as I have only a single specimen before me, and descriptions of the scales in an *Erirhinid* founded on anything short of a good series of specimens is generally misleading. The example before me has fairly closely-set whitish and yellowish-red scales on its underside and shoulders, but it is quite likely that it may be abraded and that in fresh specimens the scales are more generally distributed, and perhaps variable in pattern. The tubercles on its elytra distinguish this species readily from all others yet described which approach it structurally.

Tasmania.

EMPLESIS.

E. interioris, sp. nov. (Mas.) Sat angusta; ferruginea, squamis albidis sat æqualiter vestita; funiculi articulo 2° quam 1us multo breviori quam 3us parum longiori, articulis ceteris brevibus ; rostro modico, arcuato, quam prothorax paullo longiori ; prothorace leviter transverso, in parte antica summa manifeste constricto ; elytris punctulato-striatis, interstitiis vix convexis ; tibiis anticis breviter mucronatis. Long. (rostr. incl.), $1\frac{1}{5}$ l ; lat., $\frac{2}{5}$ l. (vix).

Very distinct from its previously described congeners by its very small size together with its uniform ferruginous color and evenly distributed whitish squamosity. The prosternum is gently concave in front of the coxæ.

Central Australia ; near Oodnadatta.

THEMELIA (gen. nov., *Erirhininarum*).

Corpus dense squamosum ; rostrum sat elongatum minus robustum sat cylindricum sat arcuatum ; scrobes antemedianæ laterales ; scapus oculum vix attingens ; funiculus 7-articulatus ; oculi subfortiter (quam *Emplesis* minus, quam

Rhachiodis magis, fortiter) granulati ; prothorax sat elongatus, basi vix manifeste bisinuata, lobis ocularibus nullis ; scutellum distinctum ; elytra quam prothorax modice latiora, subcordiformia, ad basin conjunctim fortiter bisinuata ; prosternum antice fortiter emarginatum, ante coxas sat fortiter elongatum ; coxæ intermediæ inter se minus approximatæ ; femora mutica ; tibiæ antice ad apicem parum distincte mucronatæ ; tarsorum articuli basales 2 breves, 3° alte bilobo, 4° minus fortiter exserto ; unguiculi divaricati ; segmenta ventralia 3um 4um que conjuncta quam 2um parum breviora, ultimo 2° sat æquali.

An isolated genus, as it appears to me, on account of the strong bisinuation of the front of its elytra ; a little resembles *Eniopea* in general appearance.

T. inconspicua, sp. nov. Ferruginea, antennis apicem versus infuscatis ; squamis ferrugineis griseisque intermixtis vestita ; rostro quam prothorax (maris vix feminæ sat multo) longiori, squamis griseis parce vestito ; funiculi articulo 1° sat elongato, 2° paulo breviori quam sequentes sat longiori ; prothorace quam latiori longiori, a basi antrorsum leviter rotundatim angustato ; elytris elongato-cordiformibus, quam prothorax sat latioribus, punctulato-striatis, interstitiis subconvexis (3° mox pone medium minute tuberculato). Long. (rostr. incl.), $1\frac{3}{5}$ l. ; lat., $\frac{3}{5}$ l.

At once recognisable by the small tubercle (scarcely more than a fair-sized granule) on the third interstice of each elytron immediately behind the middle. The convexity of the elytral interstices is scarcely noticeable except in an abraded specimen. The prevalent squamosity forming the ground color of the upper surface is of a fulvo-ferruginous tone, the markings (or pattern) being formed by scales of a bluish-grey color ; these latter are condensed on the sides of the prothorax, and are vaguely blotched over the elytra, being, however (in examples not at all abraded), condensed to form two oblique ill-defined subtransverse lines on each elytron—one at, the other in front of, the middle. The scales of the under surface are entirely bluish-grey. A narrow line of scales, varying in color from testaceous-grey to bluish-grey, runs down the centre of the prothorax.

N.S. Wales ; Blue Mountains, &c.

CYTTALIA.

C. tarsalis, sp. nov. Oblonga ; lætefulva, meso- et meta-sternis antennarum clava et tarsorum apice nigricantibus ; pilis subaureis supra (in elytris longitudinaliter seriatim dispositis), griseis infra, vestita ; rostro prothoraci longitudine æquali, haud carina mediana instructo ; prothorace transverso,

antice sat constricto, lateribus leviter arcuatis; scutello albo-piloso; elytris quam prothorax fere duplo latioribus, punctulato-striatis, interstitiis convexis; femoribus dentatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{2}$ l.

Distinguished from *C. griseipila*, Pasc., by its smaller size and by all its femora being dentate; from *C. munda*, Blackb. (originally described as *Myossita* as noted above), differing *inter alia* by the smaller tooth of its front femora, by its entirely fulvous legs and antennæ (except the antennal club and the apex of the tarsi) and by the linear arrangement of the elytral pilosity; and from *Diapelmus ventralis*, Pasc., and *Erichsoni*, Pasc. (with which I cannot but think it congeneric), by its longer rostrum. The tooth on the front femora is very slightly defined, that on the intermediate well marked, that on the hind very strong and large.

Victoria.

C. Sydneyensis, sp. nov. Elongata; testaceo-brunnea, corpore subtus rufescenti, antennis (clava nigra excepta) pedibusque pallide testaceis; pilis albidis (in rostro elytrisque longitudinaliter seriatim dispositis) vestita; rostro prothoraci longitudine æquali, haud carina mediana instructo; prothorace vix transverso, antice sat constricto, lateribus arcuatis; scutello obscuro; elytris quam prothorax fere duplo latioribus, punctulato-striatis, interstitiis minus convexis; femoribus anticis vix manifeste, intermediis modice, posticis fortiter, dentatis; tarsis elongatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{2}{5}$ l.

The second ventral segment is scarcely so long on the middle line as the third and fourth together. The tarsi are distinctly longer and more slender than in the species mentioned above (except *C. griseipila*, which I have not seen, but which is described as a larger insect with its anterior four femora unarmed); its dark colored scutellum distinguishes it from all except *C. munda*, from which it differs *inter alia* by its pale testaceous legs.

I have seen examples (also from New South Wales) of somewhat darker color (the upper surface dull brown, the metasternum blackish, the legs less pallid) and scarcely so elongate, which I cannot satisfy myself represent a distinct species.

N.S. Wales; near Sydney.

MISOPHRICE.

M. dispar (mas.), sp. nov. Oblonga, postice latior; rufo-testacea, capite tarsis antennarum clava et nonnullorum exemplorum rostro plus minusve infuscatis; squamis albis et nonnullis læte viridibus vestita (his in capite, prothorace, elytrorum

lateribus suturaque, et metasterni lateribus dispositis) ; rostro sat nitido, arcuato, sat gracili, supra leviter longitudinaliter sulcato (sulcis grosse sparsim punctulatis), quam prothorax vix longiori ; antennis ad medium rostri insertis ; scapo apice subito valde clavato ; funiculi articulo 1° magno (quam scapi clava majori) subgloboso vel late piriformi, 2° brevi gracili, ceteris parvis moniliformibus (sed quam 2us manifeste latioribus) ; prothorace leviter transverso, a basi antrorsum leviter arcuatim angustato, crebre sat crasse ruguloso ; elytris fortiter subgrosse punctulato-striatis, interstitiis leviter convexis ; prosterno ante coxas brevi parum emarginato. Long. (rostr. incl.), $\frac{9}{10}$ l. ; lat., $\frac{3}{10}$ l.

Of the five examples that I have seen of this minute species, three have deformed antennæ, with some of the joints of the funiculus so soldered together that the funiculus appears to consist of only 4 or 5 joints ; in the specimen described the 6 joints of the funiculus are all well defined. The S. Australian *M. oblonga*, Black., is very like the present insect, but is larger, not dilated behind the middle of the elytra, and devoid of the metallic light-green scales which clothe the head prothorax sides and suture of the elytra and sides of the metasternum in *M. dispar*. *M. munda*, Blackb., has the second joint of its funiculus longer, and also is of the same form as *M. oblonga*. *M. submetallica*, Blackb., and *setulosa*, Blackb., have the prothorax of dark color, &c., &c. The other described species are all quite different, and need not be compared with this one.

N.S. Wales ; taken near Tamworth by Mr. Lea.

M. spilota (fem.), sp. nov. Oblonga, postice latior ; rufo-testacea, capite pectore tarsis et maculis nonnullis in elytrorum parte postica positis piceis ; squamis albis setiformibus sparsim vestita ; rostro quam prothorax sat longiori, basin versus fere ut præcedentis sculpturato ultra medium fere lævi ; antennis pone medium rostri insertis ; scapo apice modice clavato ; funiculi articulo 1° elongato-piriformi (quam sequentes 3 conjuncti vix breviori), articulis 2° 3° que inter se sat æqualibus subparallelis, ceteris submoniliformibus ; prothorace transverso, sat grosse sat confertim sat rugulose punctulato, lateribus sat fortiter arcuatis ; elytris fortiter sat crasse punctulato-striatis ; prosterno ante coxas sat elongato, parum emarginato. Long. (rostr. incl.), $1\frac{1}{3}$ l. ; lat., $\frac{2}{5}$ l.

It is noteworthy that of this and the preceding (both from one locality) all the examples before me seem to be females and males respectively (I have made *sure* in respect to one of each). Nevertheless, I cannot bring myself to believe that they pertain to a single species, as the differences seem to me far too great to

be merely sexual, *M. dispar* being, as indicated above, very closely allied to, and superficially very like, several previously-described species, whereas the present one, in respect of its general appearance, is one of the most distinct species of the genus, and its structural characters are very different from those of *M. dispar*.

N.S. Wales; taken about the Tweed R. (Tamworth, &c.) by Mr. Lea.

M. quadraticollis, sp. nov. Fem. Sat angusta, postice latior; picea, antennarum scapo et pedibus (genubus tarsisque exceptis) rufis, elytris (basi excepta) rufescentibus; squamis piliformibus albidis disperse vestita; rostro quam prothorax paullo longiori, arcuato, nitido, apicem versus (a latere viso) subacuminato; antennis pone rostri medium insertis; funiculi articulo basali quam sequentes 3 conjuncti paullo breviori; prothorace leviter transverso, subquadrato, antice parum angustato, pone marginem anticum transversim leviter impresso, sat grosse punctulato; elytris sat fortiter punctulato-striatis; prosterno ante coxas modice elongato, parum emarginato. Long. (rostr. incl.), $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

Nearest to *M. submetallica*, Blackb., but without any metallic scales and with the prothorax very much less narrowed towards the front. The elytra also (in the unique example before me) are very differently colored, being pitchy black at the base, and becoming a little reddish in the posterior two-thirds of their length.

S. Australia; near Quorn.

BAGOUS.

B. clarenciensis, sp. nov. Rufus, vertice rostri basi corpore subtus et tarsis piceis; rostro quam prothorax (maris vix feminæ sat manifeste) longiori; prothorace pone apicem sat fortiter constricto; elytris striatis, interstitiis leviter convexis. Long. (rostr. incl.), 1 l. (vix); lat., $\frac{2}{5}$ l. (vix).

Easily recognisable among its described congeners by its very small size and the bright brick-red color of its whole upper surface except the head and the extreme base of the rostrum.

N.S. Wales; taken at the Clarence River by Mr. Lea.

EURHYNCHINI.

EURHYNCHUS.

E. bispinosus, Boisd. I have an example of this species from tropical Queensland. I think it has not been previously recorded as occurring in Australia.

E. splendidus, sp. nov. Niger, pedibus et antennarum clava

ferrugineis; prothorace elytris et corpore subtus squamis piliformibus coccineis ornatis [his densissime condensatis et vittas 4 (sc. 2 in corpore supra, 2 in corpore subtus) latas formantibus]; rostro quam prothorax paullo longiori, basi grosse apicem versus subtiliter punctulato; prothorace transversim fortiter strigato, lateribus rotundatis; elytris suturam versus grosse latera versus subtiliter punctulato-striatis, juxta scutellum utrinque crista parva et mox pone medium spina perlonga granulata munitis; antennarum clava quam articuli 1—8 conjuncti vix breviori, clavæ articulo ultimo quam præcedentes 2 paullo longiori; femoribus anticis dente parvo armatis. Long. (rostr. incl.), 5 l.; lat., $1\frac{1}{3}$ l.

This is a remarkably handsome species. Its color is black, with the club of the antennæ and legs reddish; on either side, on both the upper and under surface, there is a vitta of dense scarlet squamosity. The vittæ of the upper surface commence at the front margin of the prothorax, and terminate close to the apex, but are interrupted by the elytral spines and again near the apex, so that the extreme apical portion forms a small spot, separated from the vitta by a narrow interval. The vittæ of the under surface commence on the front of the prosternum, and are continuous to the apex of the second ventral segment, where they terminate. The mesosternal process is also clothed with scarlet squamosity. The elytral spines are very long (about as long as the distance from their base to the base of the elytra). The great length of the antennal club is probably a sexual character of the male.

N. Queensland; presented to me by Mr. Masters.

Cyladini.

CYLAS.

C. turcipennis, Bohem. I have lately received from Mr. Cowell an example taken near Cairns of this widely distributed species. No species of the genus has previously been recorded as found in Australia; the capture is, therefore, of considerable interest.

Haplonycini.

HAPLONYX.

H. ornatipennis, sp. nov. Ferrugineus, plus minusve picescens; squamis piceis albidis ochraceisque vestitus, his inter notas alias fasciam insignem ochraceam communem arcuatam medianam in elytris formantibus; supra æqualis (*i.e.*, nec tuberculatus nec fasciculatus); capite rostroque obscuris, hoc depresso lato recto longitudinaliter strigato quam prothorax vix

longiori; antennis læte rufis, nonnullorum exemplorum ad clavæ apicem infuscatis; prothorace conico modice transverso, lateribus vix arcuatis; elytris fortiter punctulato-striatis, puncturis in striis quadratis, interstitiis sat planis (his exemplorum abrasorum rugulosis magis convexis); femoribus omnibus subtus, et tibiis anterioribus 4 intus, unidentatis. Long. (rostr. excl.), $1\frac{4}{5}$ l.; lat., $1\frac{1}{10}$ l. (vix).

A pretty little species, easily recognisable (among the *Haplonyces* of the group devoid of tubercles and of fascicles on the upper surface and having a short depressed rostrum) by the very conspicuous bright red median fascia on its elytra; this fascia is of a curved form with its convex side directed forward. Besides the above-mentioned fascia the scales form the following markings (which, however, seem to be more easily abraded than the median fascia, as abraded examples generally have the median fascia even if all the other scales have been lost):—On the prothorax, a dark median patch and two indistinct whitish vittæ on each side; on the elytra a bright ochreous basal fascia and more or less bright ochreous coloring about the sides and apex, and a white scale on each interval between puncture and puncture in the elytral striæ (these white scales, however, very deciduous, and therefore wanting in all but very well preserved examples). The rostrum does not appear to differ much sexually.

Victoria; sent by Mr. French.

Longicornes.

PHORACANTHA.

P. lætabilis, sp. nov. (Mas.). Castanea, elytris flavis castaneo-notatis, femorum parte apicali infuscata; capite prothoraceque pube subtili grisea confertim vestitis; antennis subtus parum fimbriatis, quam corpus multo longioribus, articulo 3° haud supra canaliculato quam 4us manifeste longiori, articulis 3—6 extus breviter spinosis; prothorace vix transverso, in disco tuberculis 5 vel 7 munito, lateribus tuberculo magno conico-obtuso armatis; scutello dense flavo-hirto; elytris quam prothorax plus quam quadruplo longioribus, a basi ad medium grosse [hinc (subito) ad apicem subtiliter] punctulatis, ad apicem truncatis et bispinosis (spinis subæqualibus), latitudine majori longe pone medium posita, segmento ventrali apicali sinuato-truncato. Long., 13 l.; lat., 4 l.

The castaneous markings on the elytra consist of a spot round the scutellum, the whole suture, a narrow zig-zag fascia in front of the middle, and a wide fascia behind the middle which is narrowly prolonged hindward along the lateral margin to meet the castaneous suture so as to enclose a very large spot of the

yellow ground color. The inequalities on the prothorax are much like those of *P. recurva*, Newm., but the prothorax (as well as the head) is entirely clothed with close ashy-grey pubescence (except on the central elongate elevation) which covers the tubercles and conceals the puncturation.

N. Queensland; in the collection of Mr. French.

STRONGYLURUS.

S. minor, Blackb. In describing this species (Proc. L. Soc. N.S.W., 1893, p. 199) I omitted to remark on the fact that its head is shorter than in the other species of *Strongylurus*. It is possible that this may point to its requiring a new generic name. Its antennal characters are inconsistent with its being placed in any of the known *Strongylurid* genera having the head short. The basal joint of its hind tarsi is longer than in most species of *Strongylurus* and less flattened beneath, but this is a character that *S. ceresioides*, Pasc., shares with it. For the present, at any rate, it seems to me undesirable to separate it from *Strongylurus*.

NOTOMULCIBER (gen. nov. *Lamiinarum*).

Caput verticale, fronte transverso-quadrata; oculi emarginati, fortiter granulati; antennæ (? feminæ) quam corpus longiores, articulo 1° haud cicatricoso sat brevi (quam 6us fere breviori) piriformi, 3° quam 4us fere sesquilongiori, 4° quam sequentes longiori, his inter se sat æqualibus; prothorax transversus, postice fortiter bisinuatus, ad latera fortiter tuberculatus; scutellum transversum; elytra elongata minus convexa, ad apicem conjunctim rotundata; pedes mediocres, femoribus sat robustis leviter fusiformibus (posticis quam abdomen multo brevioribus), tibiis quam tarsi multo longioribus (intermediis emarginatis), tarsis brevibus depressis; prosternum ante coxas elongatum, pone coxas declive et triangulariter dilatatum; mesosternum antice subverticale (parte subverticali longitudinaliter carinata); acetabula intermedia extus aperta.

It will be seen from the above characters that this genus is structurally allied to *Mulciber*, differing from it notably in its much less strongly emarginate eyes. M. Lacordaire places *Mulciber* in the *Homoneides*, a Malayan "Groupe" not previously recorded as occurring in Australia. In M. Lacordaire's tabulation of his "second division" of *Lamiini* [Gen. Col. IX. (2), pp. 413, &c.] the insect on which I found this genus would fall into that "Groupe."

N. Carpentariæ, sp. nov. (Mas. ?) Sat nitidus; piceus; pube subtili obscura (hac pube ferruginea conferta maculatim

variegata) vestitus, antennis (basi excepta) tibiarum apice tarsisque rufescentibus; capite sparsim grosse punctulato, inter antennas late leviter concavo, linea longitudinali profunde impresso; prothorace inæquali, ut caput (disco medio lævi excepto) punctulato, trans basin transversim depresso; elytris ad basin quam prothoracis basis sat latioribus, quam prothorax quadruplo longioribus, obsolete 3-costatis, sat fortiter sat crebre (apicem versus magis obsolete) punctulatis, humeris quadratis (angulis humeralibus summis rotundatis); corpore subtus sparsim subtiliter punctulato; prosterno ante coxas fortiter transversim rugato. Long., 11 l.; lat., 4 l.

This is a typical *Lamiid* structurally (having the vertical head, acutely pointed palpi, and obliquely furrowed front tibiæ, characteristic of the sub-family), but it has much more resemblance to the *Cerambycides* in facies; indeed, on a casual glance it might almost be taken for a *Pachydissus*. I have omitted, in describing it, to characterise the vestiture of the antennæ, as I suspect that it is much abraded in the type (which, however, is in good condition generally), the joints being fringed beneath with very distantly *and irregularly* placed fine hairs; the basal four joints are nitid and glabrous, the rest very finely and closely pubescent.

In the specimen I am describing the lateral tubercles of the prothorax and the shoulders of the elytra are slightly rufescent. There is an excessively fine greyish pubescence, which probably in a perfectly fresh example covers all or nearly all the surface (in the type it is wanting here and there, probably through slight abrasion), and also a much more conspicuous, though still fine, rusty-brown pubescence is present forming spots and patches. The rusty-brown pubescence is condensed round the eyes, in small spots on the face, and on the sides of the prothorax; on the elytra it forms a number of more or less connected blotches, the largest of which are a spot behind the shoulder and two spots near the apex of each elytron. As far as I can see, without injuring the specimen, the derm underlying these blotches is a little reddish in color.

Cape York; in the collection of C. French, Esq.

ORICOPIS.

O. guttatus, sp. nov. Obscure brunneus, pube subtili paullo dilutiori vestitus et setis erectis albis sparsissime ornatus, elytris guttis discoidalibus binis (setis niveis densissimis formatis) variegatis; capite sparsim punctulato; antennis quam corpus paullo longioribus, subtus sparsim ciliatis, articulis basi rufescentibus, 3° quam 4us parum breviori quam 1us sat longiori; prothorace supra planato tuberculato (sc.

tuberculo parvo nitido mediano, utrinque ad disci latera tuberculo magno bifido, et in lateribus veris tuberculo conico, armato), sparsim punctulato; elytris sparsim (apicem versus obsolete) punctulatis, vix manifeste costatis, ad apicem truncatis, in parte basali tuberculis parvis nitidis ornatis (horum nonnullis biseriatim positis). Long., 6 l.; lat.,

This species is easily recognisable by the two conspicuous spots of snowy-white pubescence on the disc of each elytron—the anterior and larger one a little in front of, the other a little behind, the middle.

I do not think I can be mistaken in referring this insect to *Oricopis*, although I have not previously seen an example of the genus. It agrees perfectly with the characters assigned by Mr. Pascoe, except that I can scarcely consider the intermediate cotyloid cavities open externally. Their aperture is certainly only very narrow. However, to regard them as closed would involve placing the insect among species where it would seem quite out of place, and in all other respects it seems very close, even specifically, to the typical *Oricopis*. Its divaricate claws, intermediate tibiæ externally emarginate, tubercled mesosternum, and remarkably tubercled prothorax seem to forbid its generic separation from *O. umbrosus*, Pasc.

N.S. Wales; Tweed River District.

SYBRA.

S. Mastersi, sp. nov. Picea, pube fulva (hac grisea brunnea que marmorata) vestita; elytris macula communi (hac pube nivea densa vestita, suturam mediam late tegenti et in humerum marginemque lateralem posticum ramos obliquos utrinque emittenti); capitis prothoracisque sculptura sub pubem abdita; prothorace nonnihil inæquali, subtransverso, postice quam antice vix latiori; elytris sat fortiter subseriatim (apicem versus magis obsolete) punctulatis, ad apicem anguste sat acute productis, partis producta margine suturali sat fortiter concavo. Long., 7 l.; lat., $2\frac{1}{5}$ l. (vix).

This is a very pretty insect, and appears to be very distinct from all the numerous species of the genus previously described. It is clothed with fulvous pubescence slightly mottled with brown and white; this pubescence is very evenly distributed on the upper surface, except that each elytron is traversed by a well-defined wide band of white pubescence which, commencing on the shoulder, runs obliquely to the suture, and on reaching it runs along it to considerably behind its middle, when it turns outward and runs obliquely to the lateral margin, which it nearly touches a little in front of the apex. The under-surface is much clothed with greyish-white pubescence.

N. Queensland; presented to me by Mr. G. Masters.

The Blattariæ of Australia and Polynesia.

SUPPLEMENTARY AND ADDITIONAL DESCRIPTIONS AND NOTES.

By J. G. O. Tepper, F.L.S.

[Read March 6, 1894.]

In the treatise with the above title, published in Vol. XVII. of the Transactions of the Royal Society of S.A., some 30 species were only inserted by name, owing to the descriptions being inaccessible for me at the time. Since then I have been fortunate enough to procure Saussure's great work, entitled "Melanges Orthopterologiques" (2 vols., 1863, 1878), and am now enabled to make up the deficiency almost completely, and to correct the nomenclature.

Of those 30 species only three remain unsettled, viz., *Apolyta gracile*, Butler, *Polyzosteria Sedilloti*, Burm., and *P. variolosa*, Burm.; one name—*Epilampra mediventris*, Sauss.—disappears, as being evidently a misprint for *E. nudiventris*, Sauss., a synonym of *E. inguinata*, Stal., and another—*Ectatoderus*—has to be removed, owing to the genus belonging to the Gryllidæ and not the Blattariæ, while five proved to be synonymous of described species. This leaves 20, of which more or less complete descriptions are supplied as extracts and translations from the above work.

The later parts of Saussure's work also supplied five additional species, whose habitat is recorded as in the Australian regions, enriching the record by three genera, of which the descriptions are given.

In the meantime some more specimens have come to hand, of which the major part was contributed by my valued friend, C. French, Esq., F.L.S., and hailing from Victoria, N.S. Wales, and Queensland, among which were some new species (notably the most gigantic kind for Australia known to me). The descriptions of these and also Saussure species are given in the order adopted in the first part, and denoted by the page numbers heading the paragraphs.

Of the 193 species originally recorded, 7 are removed, and 14 new species added, which brings up the total to 200 for Australia and Polynesia, of which only those described by Walker require special verification.

PHYLLODROMIDÆ.

(Page 38.*)

TEMNOPTERYX (*Blatta*) OBSCURA, *Sauss.* (Mel. Orth., I., 61).

"Large, brownish testaceous. Head brown, with five yellow dots. Pronotum and elytrum brownish chestnut. Elytra corneous, punctulate, much abbreviated, apex rounded, sutural margins overlapping. Coxæ testaceous, base varied with brown.

Length of elytra (sex ?)	8·5 mm.
Length of pronotum	6·5 "
Width of pronotum	5·5 "

Habitat—India (?), Samoa."

TEMNOPTERYX COULONIANA, *Sauss.* (Mel. Orth., I., 22, 60, fig. 14.)

"Brownish black. Body rather elongate. Pronotum broad, semiarbicular, shining. Elytra much abbreviated, sulci distinct, costal veins raised. Abdomen of male carinate. Cerci very large, acute. Supra-anal lamina of female trigonal, of male narrow, truncate, emarginate at apex. Styles very short.

	Male.	Female.
Length of body	15 mm.	16 mm.
Length of elytra ...	8 "	7.5 "
Length of pronotum ...	4·6 "	—
Width of Pronotum ...	6·4 "	—

Habitat—New Holland" (Australia).

PARATEMNOPTERYX AUSTRALIS, *Sauss.* (Mel. Orth., II., 93, fig. 22).

"Brownish black, paler below. Elytra chestnut-brown, rounded, truncate contiguous along the sutural margin, and exceeding the second abdominal segment. Claws without arolia.

Length of body (female)	16 mm.
Length of elytra	6·5 "
Length of pronotum	5 "
Width of pronotum	7 "

Habitat—Melbourne, Victoria."

(Page 39.)

TAMNELYTRA HARPURI, *Tepp.* New locality.

Two specimens, viz., a mature female and a half-grown larva, labelled Victoria, were presented by Mr. C. French. Coll. S.A. Museum.

(Page 44.)

PHYLLODROMIA (*Blatta*) BITAENIATA, *Sauss.* (Mel. Orth., I., 63).

"Ferruginous testaceous. Antennæ thick, brown, first two joints testaceous. Pronotum trapezoidal, margins pellucid, disk

* This and following references are to Royal Soc. Trans., S.A., Vol. XVII.

yellowish ferruginous, with indistinct rusty-brown streaks and two brown bands. Elytra of female much shorter than the the abdomen, of the male much longer, pellucid ; second (scapulary) vein brownish ferruginous, costal margin broadly whitish, pellucid. Abdomen with all intra-marginal bands brown.

	Male.	Female.
Length of body	8 mm.	8 mm.
Length of elytra	8 "	6·6 "
Length of pronotum ...	2·5 "	2·5 "
Width of pronotum ...	3·5 "	3·6 " "

Habitat—Australia.

PHYLLODROMIA (*Blatta.*) SIMILIS, *Sauss.* (Mel. Orth., I., 65).

"Testaceous ferruginous. Pronotum trapezoidal, pellucid ; disk bordered testaceous ferruginous, middle pellucid. Elytra testaceous, dotted with ferruginous. Wings hyaline, discoidal vein with three branches. Abdomen ferruginous. Supra-anal lamina of male trigonal, truncate. Subgenital lamina broad, deeply cleft into two lobes, both margins with distinct small teeth at the base. Styles rudimentary.

Length of body (male)	9 mm.
Length of elytra...	9·2 "
Length of pronotum	2·5 "
Width of pronotum	3·9 "

Habitat—New Holland" (Australia).

PHYLLODROMIA ALBOVITTATA, *Sauss.* (Mel. Orth., II., 95).

"Pale testaceous orange. Antennæ black. Pronotum elliptical, disk yellow, margin pellucid. Wings subhyaline, reddish ; discoidal vein of female with four, of male with two or three branches. Abdomen blackish, segments beneath bordered with white, apex with a red spot.

	Male.	Female.	
Length of body	8·5 mm.	11 mm.	
Length of elytra... ...	9·3 "	9 "	
Length of pronotum ...	3·7 "	2·7 "	} (?)
Width of pronotum ...	2·3 "	4·2 "	}

Habitat—New Holland" (Australia).

(Page 47.)

APOLYTA PELLUCIDA, *Klug.*

A. australis, Sauss. (Mel. Orth., I., 18, 69, fig. 21).

This species was first described by Saussure as *Ellipsidion*, and later as *Thyrsocera australe.* A specimen, presented by Mr. C. French, agrees with Saussure's figure and description, excepting

the (apparently) much duller color; it is, in fact, scarcely pellucid.

Habitat—Victoria (loc. nov.). Collection S.A. Museum.

(Page 48.)

APOLYTA RETICULATA, *Sauss.* (Mel. Orth., I., 70).

"Mesonotum black, varied with yellow; metanotum and base of abdomen orange. Wings with discoidal vein emitting 4—5 branches towards the apical borders. Female short and broad, much smaller than the male. The black disk of the pronotum often with traces only of red instead of a band. Last ventral segment large, margins raised. Cerci reddish. Elytra scarcely exceeding the abdomen by 2 mm. Trochanters, tibiæ, and tarsi yellow.

Habitat—New Holland" (Australia). (Dimensions not given).

APOLYTA AURANTIA, *Sauss* (Mel. Orth., I., 70). *Bl. vestita, Burm.*

"Brown. Front and vertex orange, antennæ black. Pronotum pellucid, disk orange. Elytra testaceous orange. Wings brownish, margin orange. Legs yellow, coxæ, femora, and tarsi brownish at the apex. Abdomen bordered yellow, segments beneath and the coxæ with white.

Length of body (female) ... ... 10 mm.

Habitat—New Holland" (Australia).

By a misprint at p. 48 of my paper, "*A. reticulata*" is repeated instead of "*aurantia.*" It is doubtful if this is really the species meant by Burmeister's extremely short description: "Body wholly brown, pronotum and elytra pale yellow, brown towards apex." But even Saussure's descriptions are insufficient to identify the species of this difficult genus with any degree of certainty.

(Page 55.)

ISCHNOPTERA AUSTRALIS, *Sauss.* (Mel. Orth., I., 27, fig. 17; II., 101).

Ischnoptera australica, Br., according to Saussure.

From a comparison of the two descriptions one would scarcely be able to say that both applied to the same species, as they mostly refer to different details. Saussure only records "New Holland" as the habitat.

ISCHNOPTERA FULVA, *Sauss.* (Mel. Orth., I., 28, 71, fig. 18; II., 102).

"Yellowish brown, resembling *I. australis.* Pronotum bisulcate, margins subopaque. Elytra and abdomen broad, anal area truncate at apex.

Length of body (male)	...	...	19	mm.
Length of elytra	...	...	23	"
Length of pronotum	...	...	5–5·3	"
Width of pronotum	...	...	7·3–8	"

Habitat—New Holland" (Australia).

ISCHNOPTERA TERMITINA, *Sauss.* (Mel. Orth., I., 29, 71, fig. 19).

"Small, narrow, much elongated, ferruginous hyaline. Head concealed, vertex and front brown, with two whitish ocelliform spots. Pronotum small, elliptic, subarcuate behind; disk piceous, bisulcate, laterally pellucid. Elytra very long and narrow, not contracted towards the apex; margins scarcely curved.

Length of body (male)	...	...	11	mm.
Length of elytra	...	...	13	"
Length of pronotum	...	...	2·7	"
Width of pronotum	...	...	3·4	"

Habitat—New Holland" (Australia).

ISCHNOPTERA TRIRAMOSA, *Sauss.* (Mel. Orth., I., 72).

"Testaceous. Head spotted with brown. Pronotum opaque, deflexed laterally, nearly straight behind, disk varied with brownish ferruginous. Wings hyaline, foremargin subtestaceous, discoidal vein with three apical branches, and emitting four or five rudimentary ones towards the anal area. Abdomen clouded with brown.

Length of body (female)	...	...	13	mm.
Length of elytra	...	...	13	"
Length of pronotum	...	...	3	"
Width of pronotum	...	...	4·5	"

Habitat—Brisbane" (Queensland).

EPILAMPRIDÆ.

(Page 56.)

PARAPHORASPIS (?) CASTANEA, *spec. nov.*

Chestnut-brown, shining, almost concolorous. Pronotum nearly black, rounded behind, very finely impressed punctate, with some larger distantly scattered pits, posteriorly an impressed lyrate figure in the middle, but only visible with a lens. Elytra subcorneous, flat, very closely, finely, and, near the margin, irregularly veined. Wings smoky. Femora spinose. Supra-anal lamina of female longer than wide, lateral margins straight, hind-margin deeply and broadly emarginate, lobes acutely angular. Cerci large, lanceolate, acutely acuminate, much exceeding the lamina. Coll. S..A. Museum.

Length of body (female)	...	...	22	mm.
Length of elytra ...	...	...	17	"
Length of pronotum	...	...	5	"
Width of pronotum	...	...	8	"

Habitat—Howbulan, Victoria (presented by C. French, F.L.S.).

A single female and rather damaged, but the characters are so different from all others known to me, that it is only provisionally placed in this genus.

(Page 66.)

Epilampra mediventris, Sauss.

Evidently a misprint for *E. nudiventris*, a synonym of *E. in quinata*, Stål, and thus represents no species.

Epilampra (*Homalopteryx?*) pectinata, *Sauss.* (Mel. Orth., I., 91).

"Testaceous brown, dotted all over with reddish brown. Head prominent, longitudinal band brown. Pronotum transverse, much arched, shining, angular behind. Elytra as long as the abdomen, apex broad. Wings concolorous, anterior area broad at the apex, obtuse; veins straight, incurved at apex; discoidal vein with three pectinate apical branches, five incomplete ones, and five to seven rudimentary. Abdomen brownish above, below with scattered brown granules. Supra-anal lamina rounded, slightly emarginate. Subgenital lamina with the margin produced in the middle.

Length of body (female)	...	...	16	mm.
Length of elytra ...	...	...	16	"
Length of pronotum	...	...	6	"
Width of pronotum	...	...	8	"

Habitat—New Holland" Australia.

Not having seen specimens I leave the species as placed by its author, but it scarcely fits into the genus on account of the structure of the supra-anal lamina, &c.

Epilampria Tatei, *spec. nov.*

Brown, varied (except pronotum). Head *prominent*, blackish; antennæ, sides of face, and mouth-parts yellowish, a curved brown bar between the antennæ, a pale yellow rounded spot on the inner side of each of the sockets of the antennæ. Pronotum slightly truncate in front, produced behind, slightly impressed punctate; hindmargin *without the usual raised striæ;* margin all round narrowly reflexed, broadly pale yellow in front, remainder brown. Legs pale yellowish; tibiæ brownish. *Femora unarmed.* Elytra much exceeding the abdomen; radial vein emitting two straight branches posteriorly near the middle; ulnar vein *curving parallel to the anal and emitting several dichotomous branches towards the*

apical border; anal vein gradually curved and terminating near the middle of the hindmargin; membrane brown, translucent,; margin of costal area dark brown, larger part of costal vein bordered broadly with black, radial vein dark brown at and beyond the middle; *basal half of veins impressed punctate;* basal half of elytra with a row of minute brown dots between most of the veins. Wings with a distinct, but small, triangular area, pale translucent; veins dark brown, transverse veinlets whitish. *Abdomen short, broad,* piceous above, paler at the base, testaceous beneath; margin broadly black. Supra-anal lamina of female *large, flat; median furrow distinct, hindmargin semicircular, entire.* Subgenital lamina *very large, transverse, arcuate; hindmargin subsemicircular.* Cerci lanceolate, *much shorter than the lamina.* Collection S.A. Museum.

Length of body (female)	...	...	17·5 mm.
Length of elytra	...	...	18 "
Length of pronotum	...	...	3·5 "
Width of pronotum	...	...	6·5 "

Habitat—Yam Creek, Northern Territory of South Australia (presented by Prof. R. Tate, F.L.S.).

There is a single, but perfect, specimen before me which, however, differs in so many details from other species known to me that it probably requires a separate genus for its reception, the characters of which are indicated by the italicised portions of the above description. The species resembles *Nauphoëta* to some extent, but differs in the structure of the anal appendages. The place of the suggested genus would be probably between *Phoraspis* and *Epilampra.*

(Page 67.)

GEOSCAPHEUSIDÆ.

GEOSCAPHEUS ROBUSTUS, *Tepper.*

Since the publication of my first paper I have received specimens of this species from two more localities very far apart, and showing the wide distribution, viz., from the neighbourhood of Oodnadatta in Central Australia, and Victoria. Of the latter place they are in the possession of Mr. C. French. Those of the former were presented by Mr. J. Lipman, Adelaide, during September, 1893. Of the ten specimens three had survived the rough transit by post in almost a loose packing, and were put in a tin with a thick layer of compressed moist soil, a mixture of clay and sand. They at once exhibited their appreciation of the new quarters, and also their surmised habits, by burrowing into the soil head foremost and concealing themselves. When thus engaged they employ not only head and forelegs, but also the other two pairs, appearing to *sink* into the soil without raising

any considerable quantity above the surface, nor do they appear to form an unobstructed tunnel, as a part of the dislodged soil appears to be pressed against the sides, while the remainder fills up the space behind the insect. A few seconds suffice them to get out of sight, reminding the observer very much of the *modus operandi* of the Australian Anteater *(Echidna hystrix)*. When turned out on a firm surface in bright daylight they ramble and run about actively without exhibiting any alarm or fear. As food they were offered earthworms, grubs, caterpillars, breadcrumbs, woodlice, and a Tenebrionid beetle (*Pterohelæus*, sp.). The first three disappeared successively, but the last were not touched, nor were some specimens of *Julus* molested. One of the three died after a few days, while the remaining two (a pair) were still alive more than three months after receipt, although for weeks they would not eat anything that could be procured, owing to the absence of worms in the dried-up soil. That in which they lived was, however, kept moist by being wetted at intervals.

It is to be observed that neither these nor the species of *Polyzosteria* and *Anamesia* as defined by Brunner and myself possess any odour, while *Platyzosteria*, &c., are notorious for evil smelling.

GEOSCAPHEUS GIGANTEUS, *spec. nov.*

Brownish red, convex, shining, very large and bulky. Body elongate oval. Head large, very smooth, flat, finely punctate, brown, anterior border blackish, remainder of face slightly excavated; clypeus red, labrum varied blackish and brown, base pale ferruginous; sides black, an oblique groove, and the sockets of the antennæ pale ferruginous; palpi and antennæ chestnut-brown; basal joints of antennæ obconical, curved, longer than the two following together; second and third joints subequal, more than twice as long as any of the succeeding ones, remainder very short, annular, diminishing in diameter. Pronotum transverse, subtrigonal, conspicuously and broadly hooded in front in the female, incrassated and raised into a short emarginate ridge in the male, deeply and rugosely excavated in the middle; disk blackish, finely punctate, margin more distinctly impressed punctate, hindmargin nearly straight, angles much rounded, not produced. Meso- and meta-notum very shining hind-angles prominently produced, rotundate. Wingless. Fore-legs similar to *G. robustus*; femora with three spines, anterior ones shortest, median longest; dactile spines of tibiæ very long and stout, base wrinkled, all black. Abdomen with a few minute distinct dots in the disk, margin with coarser, more numerous pits; hindangles of segments triangularly but slightly produced, not acute ,those of seventh segment alone produced as an erect

stout spine; hindmargin of sixth segment of male with six or seven small obtuse teeth on each side; ventral disk red, margin black. Supra-anal lamina transverse, depressed, very much wider than long, coarsely impressed punctate, hindmargin convex, entire. Cerci very short, broadly oval, ciliate (male). Subgenital lamina of male small, transverse, hindmargin rounded. Collection S.A. Museum.

	Male.	Female.
Length of body ...	35–37 mm.	50–52 mm.
Length of pronotum ...	9–10 "	14–15 "
Width of pronotum ...	16–17 "	25–26 "
Width of abdomen ...	20–21 "	30–34 "

Habitat—North Queensland (presented by C. French, Esq., F.L.S.).

This splendid species differs from *G. robustus* in very much greater size, paler color, smoother texture, different form of pronotum and supra-anal lamina, the hindangles of the seventh segment of the female alone bearing a curved spine, and the dentate hindmargin of the sixth segment of the male. The dissimilarity in size of the two sexes, of which two pairs were before me, is very remarkable.

The species is the largest and bulkiest Blattarid among the Australian representatives so far as I am acquainted with them, and is probably not exceeded by any species elsewhere.

(Page 72.)

ANAMESIA (?) FULVORNATA, *spec. nov.*

Flat, elongate-oval, ochreous above, brown beneath, shining. Head prominent, labrum yellow. Pronotum subsemicircular, lateral margins rugose with coarse impressed dots, hindmargin nearly straight, disk with distant impressed dots and brownish-red figures resembling oriental letters in a circularly-bounded area. Meso- and meta-notum similar, distantly spotted with brownish-red. Legs and whole underside concolorous. Abdomen impressed, dotted; hindangles scarcely angular, basal half of segments brown. Supra-anal lamina of male transverse, quadrilateral; lateral margin with a few minute spines, hindmargin unarmed, slightly concave. Cerci deficient (?). Collection S.A. Museum.

Length of body (male)	25–26 mm.
Length of pronotum	5– 5·4 "
Width of pronotum	11–12 "

Habitat.—Howbulan, Victoria (presented by C. French, Esq., F.L.S.).

The specimens examined consist of two somewhat dilapidated

males, deficient of antennæ, part of legs, and also the cerci and styles. They resemble *A. Eastii* in the texture of the dorsal surface, but are much smaller, less bulky, and the markings quite different. The species scarcely fits into the genus, having apparently some affinities with *Dasyposoma castanea*, Sauss., but is placed here till an opportunity offers to compare specimens of both, and better examples obtained.

(Page 82.)

Polyzosteria cuprea, Sauss. Mel. Orth., I., 5.

This was placed by me through misconception under *Platyzosteria*, but is recorded and cancelled by Saussure as synonymous with POLYZOSTERIA MACULATA, *Brunner*, already described.

Polyzosteria bicolor, Sauss. (*ibid* II., 79; II., 112)=PLATYZOSTERIA LIGATA, Br.

A variety (?) is also described with the margins of the third thoracic segment wholly yellow from "New Holland."

Polyzosteria biglumis, Sauss. (*ibid*)=PLATYZOSTERIA SUBAPTERA, Br.

Polyzosteria consobrina, Sauss. (*ib.*)=PLATYZOSTERIA ATRATA, *Erichs.*

Polyzosteria analis, Sauss. (*ib.*)=PLATYZOSTERIA MELANARIA, *Erichs.*

Polyzosteria pulchella, Sauss. (*ib.*)=POLYZOSTERIA LIMBATA, *Burm.*

The changes are indicated by Saussure himself.

POLYZOSTERIA MITCHELLI, *Angas* (*Sauss.*, Melb. Orth., II., 106).

A full description is given of this species (figured but not described by Angas), but evidently of spirit specimens, apt to be distorted and always discolored.

In regard to another species, an observation is made by the same author assigning one of the older names to synonymy, on account of insufficient description, and with which I also agree, viz. :—

"*Blatta verrucosa*, White, in Appendix to Gray's Journal of Two Expeditions in N.W. and W. Australia, is probably the same as POLYZOSTERIA REFLEXA, *Brun.*"

POLYZOSTERIA FRENCHII, *spec. nov.*

Elongate-elliptical, dull blackish with a greenish tinge. Head dark, impressed punctate, foremargin of clypeus reddish-brown and a red spot on each side, labrum brown, palpi pale, antennæ a little darker, both ciliate, basal joint of latter brown. Pronotum semicircular, slightly hooded, foremargin not reflexed, slightly

produced ; lateral margins narrowly reflexed, anterior half narrowly brown, posterior half as well as the whole of the meso- and meta-notum broadly yellow and coarsely impressed punctate, disk minutely impressed punctate, with two distinct small pits near the middle, a short ridge in front of the pits and various small smooth areas more or less rounded. Meso- and meta-notum similar, lateral lobes distinctly produced, and two shallow pits on either side anteriorly. Legs brown, coxæ bordered pale-yellow, femora pale at apex. Abdomen dull-blackish, very finely punctate, lateral margins very narrowly yellow, angles of segments 2–6 acute, slightly produced, of segment 7 forming acute, triangular, flat, yellow spines, lateral margin bordered very narrowly with yellowish, an intramarginal row of oblong, smooth impressions, segments 7–8 narrowly exposed. Ventral segments bronzy-blackish, lateral and posterior margins pale-yellow to brownish-red. Supra-anal lamina transverse, trapezoidal, hindmargin truncate, depressed medially, yellow, lateral margins concave, angles acute. Cerci broadly lanceolate, concave above, bordered yellow, much exceeding the lamina, apex shortly acuminate. Subgenital lamina shiningly smooth, brown, broadly bordered with yellow, hindmargin broadly and rotundately emarginate. Styles stout, rather long, almost apically inserted. Collection S.A. Museum.

	Male.
Length of body	37 mm.
Length of pronotum	9·3 "
Width of pronotum	21 "
Width of abdomen	23 "

Habitat.—Victoria (presented by C. French, Esq., F.L.S.)

The species, of which there is a single male, resembles *P. patula* to a certain extent, but it is longer and narrower, and the genital appendages are very different, besides the difference in colour and markings.

(Page 83.)

PLATYZOSTERIA MELANARIA, *Erichs.*

Var. *grandis*, Sauss., Mel. Orth. II., 109.

"Thick, slender, black above, chestnut beneath. Antennæ reddish, base brown. Supra-anal lamina exceeding the cerci, trigonal, apex emarginate, seven spines on either side.

Length of body (female)	43 mm.
Length of pronotum	10 "
Width of pronotum	15·1 "
Width of abdomen	17 "

Habitat.—Melbourne (Victoria).

(Page 95).

PLATYZOSTERIA HEYDENIANA, *Sauss.* (Mel. Orth., I., 76).

Periplaneta Heydeniana, Sauss. *(ibid).*

"Slender, depressed, brownish-testaceous. Body with brownish-testaceous streaks and intramarginal lines, margin brown. Abdomen brownish behind and beneath. Elytra scale-like, narrow, apex rounded.

Length of body (both sexes) ...	..	19 mm.
Length of pronotum	...	5·6 "
Width of pronotum	...	7·6 "

Habitat.—New Holland" (Australia).

PLATYZOSTERIA LITURATA, *Sauss.* (Mel. Orth., II., 108, fig. 36.

"Brownish-black, a little wider behind than in front. Thorax and abdomen ornamented on both sides with broad yellow streaks ending with the fifth abdominal segment. Head yellow, a trigonal facial spot chestnut. Legs yellow-testaceous. Posterior tibiæ and tarsi brown. Cerci depressed, acute. Supra-anal lamina transverse, rotundately bilobed. Subgenital lamina entire, margin arcuate, elongate.

Length of body (male)... ...	..	20 mm.
Length of elytra	...	3·3 "
Length of pronotum	...	6·6 "
Width of pronotum	...	9·2 "

Habitat.—New Georgia" (Polynesia)?

This species apparently resembles my *Drymaplaneta submarginata* very much in coloring, but the genital appendages of the latter are almost quadrate, and not bilobed. There is, however, a single specimen in the collection S.A. Museum which has a bilobed supra-anal lamina, and may be referred to the above; the cerci are, however, much longer.

PLATYZOSTERIA BIFIDA, *Br.* (in litt. Sauss., Mel. Orth., II., 110, fig. 37.

"Blackish chestnut, depressed. Pronotum semiorbicular. Coxæ bordered dull reddish. Supra-anal lamina triangular, produced, elongate. Subgenital lamina elongate, quadrate, cordiformly incised.

Length of body (male)	...	30 mm.
Lenth of pronotum	...	7 "
Width of pronotum	...	11·2 "

Habitat.—Queensland."

PLATYZOSTERIA ZONATA, *Walker* (?).

A specimen of a female (larva) presented by C. French Esq.

agrees so well with Walker's description (as far as it goes) that I have little doubt in referring it to this species, and from it the following fuller description is drawn up. Being, however, immature, it may really belong to the next species notwithstanding their widely distant habitat, &c.

Black. Head reddish brown. Antennæ brown, middle portion above third joint black. Pronotum smooth, shining, with a few distant impressed dots; margin all round pale yellow; disk black, oval. Meso- and meta-notum similar, the black discal spot *forming a narrow transverse segment of a circle*, convex behind. Legs reddish brown, coxæ bordered yellow and black. Abdomen very broad behind, scabrous, *concolorous*, hindangles produced acutely behind. Subgenital lamina prominent, subsemicircular, deeply carinate (not valvate).

Length of body (female)	...	...	15	mm.
Length of pronotum	...	...	4	"
Width of pronotum	...	...	6·5	"
Width of abdomen	...	...	9·5	"

Habitat—Queensland.

PLATYZOSTERIA SUBZONATA, *spec. nov.*

Brownish black, shining; male convex, female flat. Head and antennæ brown, ocelliform spots minute, foremargin of clypeus broadly testaceous. Pronotum elliptical, fore and lateral margins broadly yellow, hindmargin narrowly yellow (the pale band more or less imperfectly contiguous with the pale lateral border in the male and widely separated in the female), disk black, rounded in front, acute angular behind. Meso- and meta-notum with lateral and hindmargins similar, disc black, *angular*. Legs brown. Abdomen roughly impressed punctate, hindmargin of segments reddish brown, lateral margins with a yellow spot, reproduced much smaller beneath. Supra-anal lamina of male truncate; hindmargin entire, paler, densely ciliate; of female, rounded, black. Cerci of male subterete, black; apex acute, red; of female wholly red. Subgenital lamina of male transverse; hindmargin concave, angles forming short spines. Styles rather long red. Collection S.A. Museum.

		Male.	Female.
Length of body ...	...	18 mm.	22 mm.
Length of pronotum	...	4·5 "	6 "
Width of pronotum	...	8·3 "	10·5 "
Width of abdomen	...	9 "	14 "

Habitat—Victoria (presented by C. French, Esq., F.L.S.).

This species belongs to the same type as the preceding and *P. trifasciata*, Tepp., but differs from both not only in the color marks, but in various other more essential details.

PLATYZOSTERIA (?) PICTA, *spec. nov.*

Reddish chestnut; oval. Margin of clypeus, and the antennæ beyond the first joint, yellow. Pronotum semicircular, angles obtuse, hindmargin slightly produced in the middle, finely impressed rugulose, with distant shallow pits and smooth spots of various forms; *laterally a broad intramarginal yellow band*, widely separate in front, *curved inward* behind but not attaining the hindmargin, and bordered exteriorly with brown, including the whole posterior angle. Meso- and metanotum similar, the broad oblique yellow bar terminating acutangularly inward; hindangles slightly and obtusely produced. Elytra absent. Legs and underside of body color, coxæ bordered yellow. Abdomen *rugulose*, with rows of coarsely-impressed pits, confluent on the posterior segments, each segment laterally with an *oblique*, *subtriangular* bar, bordered brown (reproduced beneath as a small spot), and a few brown dots. Supra-anal lamina rugulose, arcuate, rounded, margin slightly serrulate, a triangular yellow spot on each side near the base. Cerci brown, acute, not exceeding the lamina. Apex pale. Collection S.A. Museum.

	Fem. (mature).	Fem. (larva ?).
Length of body ...	... 25 mm.	23 mm.
Length of pronotum	... 7 "	6·5 "
Width of pronotum	... 12·5 "	11·5 "
Width of abdomen	... 16 "	13 "

Habitat.—Cooktown, North Queensland; Victoria (?) (presented by C. French, Esq., F.L.S.).

There are two specimens of females before me which agree in general aspect, but differ in some details, due probably to age. The pale band of the pronotum of the smaller one is contiguous in front, not widely separate, as in the other, and much more distant from the hindmargin; the bands of the meso- and metanotum, also of the abdomen, are very much smaller, the pale spots of the lamina wholly absent, and the cerci black.

Altogether the aspect and markings of this species are so different from its congeners that its place in this genus seems doubtful, and it might be assigned with almost equal reasons to *Anamesia*, *Polyzosteria*, or a separate subgenus, possessing intermediary affinities and differences. The present work is still of a preliminary character, and only when larger collections of species and individuals have been brought together and critically collated will any finality in arrangement be possible.

PLATYZOSTERIA EXASPERA, *spec. nov.*

Chestnut, shining. Head red, mouthparts blackish, ocelliform spots minute, antennæ brown, basal part black, except first segment. Pronotum semicircular, with a few impressed dots on the

minutely shagreened surface; lateral margins narrowly reflexed, hindmargin slightly convex, finely subserrate, hindangles produced. Meso- and metanotum similar, impressed dots more numerous. Elytra lobiform, almost free, scabrous, exceeding the mesonotum. Tibiæ and tarsi partly or wholly black, coxæ black, bordered yellow; femora red. Abdomen nearly smooth, hindmargins of segments with minute distant, raised striæ; hindangles of segments three to six produced into successively larger, flat, acute spines; underside blackish, hindmargins of all segments scabrous. Supra-anal lamina of male subtransverse, narrower behind, rugulose, lateral margins reflexed, middle depressed; *angles acute, spinelike;* hindmargin ciliate, nearly straight. Cerci sublanceolate, ciliate, much shorter than lamina; black, apex red. Subgenital lamina of male transverse, subquadrate, laterally much incrassated; hindmargins subsinuous, angles produced as obtuse spines. Styles red, *inserted in an excavation of the lateral ridge* exterior to the terminal spines and *in a line with the hindmargin.* Collection S.A. Museum.

Length of body (male)...	18	mm.
Length of elytra	3	"
Length of pronotum	5	"
Width of pronotum	9·5	"

Habitat—Victoria (presented by C. French, Esq., F.L.S).

The species resembles *P. castanea*, *nova-zealandiæ*, and *pseudocastanea* in aspect, but differs in the colors of the tibiæ and tarsi, and especially in the structure of the supra-anal and subgenital lamina.

(Page 96.)

LEPTOZOSTERIA SECUNDA, *spec. nov.*

Elongate oval, yellowish, translucent, very shining. Head and palpi pale, antennæ a little darker; face with a black longitudinal band. Pronotum broadly elliptical, angles rounded, fore- and hindmargin black; disk anteriorly with a black figure in the middle like the conventional flying birds in diagrams; a curved black oblique streak on each side, acute in front, broad in the middle, converging towards the middle of the hindmargin and rotundately joining that from the opposite side. Mesonotum with fore- and hindmargin black as far as the elytra, slightly raised, distant diverging ridges medially, and a small oval black dot on each side near the middle. *Elytra lobiform, free, acuminate*, apex black. Metanotum with foremargin black in the middle, hindmargin black throughout, in the disk a short black streak on each side; no raised ridges. *Wing lobes discernible*, not free. Legs, underside of thorax, and lateral margins of abdomen pale yellowish, spines of former and disk of latter varied brown

to black. Abdomen finely impressed punctate, segments finely serrate, angles acute, *produced as a short, flat, trigonal spine posteriorly*, lateral margins yellowish, foremargins of first and second segment pale; hindmargins, except of last segment, black, widest in the middle; disk reddish chestnut. Supra-anal lamina arcuate, narrowly trigonal, pale, base black; hindmargin broadly and angularly emarginate, lobes acute, lateral margin dentate. Cerci lanceolate, acute, serrate, ciliate, pale, flat, more than twice exceeding the lamina. Valvules of female highly arcuate, black, apex pale, ciliate. Collection S.A. Museum.

Length of body (female)	... ...	24 mm.
Length of elytra	... ...	3·5 "
Length of pronotum	... ...	6 "
Width of pronotum	... ...	11·5 "

Habitat—Cooktown, Queensland (presented by C. French, Esq., F.L.S.).

The above description is drawn up from a specimen of a female, being the second species of this singular genus. It agrees with the other in general aspect and the curious translucency of the pale portions of the scutum, which permits the internal musculation, &c., to be seen even in dry specimens, but differs largely in markings and other details, as, for example, the presence of lobiform elytra.

(Page 106.)

PERIPLANETA MARGINALIS, *Sauss.* (Mel. Orth., I., 81) = *P. ligata*, Br.

The synonymy is indicated by Saussure, and a variety recorded with two testaceous spots on the disc of the pronotum.

PERIPLANETA FLAVICINCTA, *Hagenbach*, *Bijdragen*, 1842; *Brunner*, Syst. Blatt., 231; *P. soror* (?), Sauss, Rev. Zool., 1864, 319, 24; Mel. Orth., I., 81.

"Chestnut, shining. Pronotum very smooth, oblong, semiorbicular; hindmargin straight, angles scarcely rounded, a yellow central spot and similar intramarginal streaks sharply defined and produced along the marginal area of the elytra. Elytra and wings shorter than the abdomen.

Length of body (male)	...	18 mm.
Length of elytra	... ...	10 "
Length of pronotum	...	7 "
Width of pronotum	...	8·5 " *(Brunner).*"

Habitat.—Java (*DeHaan*); New Holland (*Saussure*).

Brunner states that DeHaan's description, based upon one individual (Novara Museum), was very short, and that he supplemented the same (apparently from the same specimen).

Saussure had previously described a similar species (1864) as *P. soror*, unknown to Brunner, from Australian specimens, and claims priority for his name on account of the insufficiency of the first description. On the absence of specimens from either locality, the point cannot be decided, but they may, after all, be separate.

Periplaneta Heydeniana, Sauss. = PLATYZOSTERIA HEYDENIANA.

(Page 107.)

PERIPLANETA GLABRA, *Walker*.

A specimen of a female, collected, according to the label, in North Queensland, was among those presented by Mr. French, and identical with the Northern Territory specimens.

(Page 114.)

ARCHIBLATTA, *Snellen*. Tijdschr. Ent. Leyden, V., 106, pl. 6, fig. 12 ; *Brunner*, Syst. Blatt., 248.

Planetica, Sauss. (Mel. Orth., I., 38).

"Pronotum narrow, trapezoidal, foremargin emarginate, disk rugose, legs long, femora very slender, terete, unarmed. Males winged. Elytra much longer than the body, veins forked, scapulary vein much raised, and vein impressed. Veins of the wings much branched. Abdomen dilated, segment 7 covering the succeeding ones. Supra-anal lamina quadrate, angles obtuse, doubly exceeded by the cerci. Subgenital lamina produced, rotundate, with short styles.

Females apterous. Meso- and meta-notum much produced, hindmargins unequal. Abdomen thick. Supra-anal lamina triangular, produced, cerci shorter."

ARCHIBLATTA HOEVENI, *Snellen*. Br. Syst., 248, fig. 39.

Planetica aranea, Sauss., Melb. Orth., I., 38, fig. 23.

Brownish-black. Antennæ annulate. Pronotum rugose, margins all incrassated. Elytra of male with costal area deflexed at right-angles, anal area very long, axillary vein very forked. Meso- and metanotum of female rugose, produced behind. Legs very long, femora terete, tibiæ with a few small spinelets. Abdomen orbicular."

	Male.	Female.
Length of body	34 mm.	53 mm.
Length of elytra	42 "	—
Length of pronotum ...	10 "	14 "
Width of pronotum ...	11 "	13 "

Habitat.—Sumatra (*Snellen*); India (*Brunner*); N. Guinea (*Saussure*).

The above is an abstract of Brunner's description; that of

Saussure is much shorter and less efficient, but his figure very good.

CHORISONEURIDÆ.

(Page 116.)

CHORISONEURA PECTINATA, *Sauss.*, Mel. Orth., II., 131.

Piceous, head reddish, vertex testaceous. Pronotum pellucid, with two brown stripes. Elytra pectinately veined, foremargin and suture pellucid, median band brown.

	Male.
Length of body ...	8·5 mm. (to end of elytra)
Length of elytra ...	7 "
Length of pronotum	1·4 "
Width of pronotum	2 "

Habitat.—New Holland" (Australia).

PANCHLORIDÆ.

(Page 118.)

ONISCOSOMA CASTANEA, *Brunner.*

Zetobora granicollis, Saussure, Mel. Orth., I., 33, fig. 21.

Through Messrs. C. French and F. J. Billinghurst I obtained 20 specimens of this species collected in Victoria, viz., six males, eight females, and six larvæ, and I find that in aspect they all differ sufficiently from the usual form, so that one may separate the two almost at a glance, while the differences in more essential characters (at least for me) are very slight. The Victorian form is much darker in color, viz., almost black, and the granules apparently much more numerous, conspicuous and darker, while the males are also narrower across the elytra, when at rest, notably beyond the middle, and the larvæ less conspicuously marked. I therefore suggest Saussure's trivial name to be retained as a varietal one for the Victorian form, viz., "*var. granicollis*, Sauss.," he most likely having obtained his specimens from the eastern part of Australia. Collection S.A. Museum.

A larva from Cooktown, Queensland, presented by C. French, probably belongs to another species, being very promiscuously colored. It has a very broad pale margin all round, a similar median stripe divided by a fine black line, a short, angular, pale transverse band on the second segment of the abdomen; and a pale patch from the sixth to the apex, remainder of disk blackish. All parts are covered with raised granules, which are black in the pale areas, and form transverse rows, notably along the hind-margins. The cerci are extremely short.

Length of body, 18 mm.; of pronotum, 4 mm.; and the width of the latter, 4 mm. Until mature specimens can be studied I cannot attach any name. Collection S.A. Museum.

PERISPHAERIDÆ.

(Page 122.)

DEROCALYMMA CONTIGUA, *Sauss.* (Mel. Orth., II., 140, fig. 51).

"Chestnut. Eyes contiguous, antennæ reddish. Pronotum much arched, unequally punctate, foremargin broad, slightly arched, hooded, extending lobelike on both sides; hindmargin much arched, excised on both sides, inferior facial ridge ending in processes. Elytra chestnut, wings hyaline. Femora nearly unarmed. Abdomen broad, orange above, red beneath.

Length of body (male)	...	...	...	15 mm.
Length of elytra	...	...	...	15 "
Length of pronotum	...	...	...	5 "
Width of pronotum	...	...	...	6 "

Habitat.—New Guinea."

ECTATODERUS NOUMEENSIS, *Sauss.*

Genus and species belong to the GRYLLIDÆ.

PANESTHIDÆ.

DASYPOSOMA, *Brunner* (Syst. Blatt., 387, fig. 59.

"Pronotum semiorbicular, rather shining. Apterous. Legs very stout. Supra-anal lamina rotundate, subgenital lamina of the male and last ventral segment of female almost alike.

Cryptocercus, Scudder.

The genus as established by Brunner only embraced three American species, to which Saussure subsequently added the following, which may probably be referable to some other genus.

DASYPOSOMA CASTANEA, *Sauss.* (Mel. Orth., I., 105).

"Stout. Reddish chestnut. Head and legs orange testaceous.

Length of body (male)		...	...	32 mm.
Length of pronotum	...	...	...	10 "
Width of pronotum	...	...	...	15-5 "
Width of abdomen	...	...	...	19 "

Habitat.—'New Holland" (Australia).

Dasyposoma nigra, Br. (Syst. Blatt., 388, fig. 57. Brazil).

Brunner's figure resembles in outline, aspect of thoracic segments, and lamina my *Anamesia fulvornata;* but the angles of the abdominal segments are neither produced, nor angular, being rounded, while the surface sculpture differs widely. It may be, however, that the latter and Saussure's species form an allied genus or subgenus.

(Page 124.)

PANESTHIA DILATATA, *Sauss.* (Rev. Zool., 346, 64 (male); Mel. Orth., I., 105).

"Sculpture of pronotum sometimes little apparent, V-shaped ridge strongly developed. The female (according to Brunner *in litteris*) with two stout, acute, perpendicularly erect spines on the sixth abdominal segment. (Dimensions not given.).

Habitat—New Holland" (Australia).

Panesthia regina, Sauss. (Mel. Orth., I., 39, 105, fig. 24).

Synonymous with P. MORIO, *Brunner.*

(Page 126.)

Panesthia cribrata, Sauss.=P. JAVONICA, *Serv.*

"One of the numerous varieties."—*Saussure* (Mel. Orth., I., 106).

PANESTHIA KRAUSSIANA, *Sauss.* (Mel. Orth., II., 150).

"Chestnut, shining, wingless. Head concealed, band from the eyes to the clypeus yellow. Thorax on both sides with a broad orange band. Pronotum granulate, in front entire, reflexed. Abdomen near margin punctate, reddish. Supra-anal lamina subcrenulate in the middle. Tarsi yellow beneath.

Length of body (female) ...	...	32 –41 mm.
Length of pronotum ...	...	8·2–10 "
Width of pronotum ...	...	13·5–15·5 "
Width of abdomen ...	...	18 –20 "

Habitat—Melbourne" (Victoria).

PANESTHIA LAEVICOLLIS, *Sauss.* (Mel. Orth., II., 151).

Blackish chestnut. Pronotum shining, foremargin entire, disk angularly impressed. Elytra marginally punctate. Supra-anal lamina cranulate.

Length of body (female)	...	...	28 mm.
Length of pronotum ...	...	...	7 "
Width of pronotum ...	...	...	10·3 "
Width of abdomen ...	...	...	15 "

Habitat—New Holland" (Australia).

Among the specimens received from Mr. C. French is a male which may be mated with the above on account of the conformity of structure of the pronotum, color, size, &c.. I therefore add its description.

Male. Blackish chestnut, shining. Head prominent, concolorous; clypeus pale yellow; antennæ and palpi brown. Pronotum subhexagonal, entire in front and not reflexed; tubercle scarcely perceptible; anterior lateral margin broad

much reflexed, punctate, brown ; remainder of margin scarcely reflexed ; hindmargin slightly convex ; disk finely punctate v-shaped furrow rather deep, included space rugose. Elytra long, brown ; base of scapulary and the anal vein pale, other veins deep brown ; costal margin broad, punctate. Wings smoky, as long as the elytra. Posterior part of the coxæ, the knees and tarsi testaceous. Abdomen rugosely punctate, hindangles of segments acute, slightly produced ; base underneath reddish. Supra-anal lamina transverse, hindmargin rounded, crenulate ; first tooth on each side larger and longer. Cerci thick, scarcely prominent, ciliate, testaceous ; apex oval. Subgenital lamina very broad, subsemicircular, very rugose ; margin entire. Styles obsolete. Collection S.A. Museum.

Length of body (male) ...	...	28 mm.
Length of elytra ...	...	26·5 "
Length of pronotum ...	...	5·5 "
Width of pronotum ...	...	9·3 "
Width of abdomen ...	...	12·5 "

Habitat—Victoria.

PARANAUPHOETA, *Brunner*, Syst. Blatt., 397.

"Pronotum rotundate in front leaving the head free, truncate behind, disk depressed, flat. Elytra leaving scutellum free, narrowed in the middle ; veins distinct, anal vein attaining the middle of the sutural margin. Wings membranous. Legs slender. Abdomen elongate. Supra-anal lamina rounded. Cerci short. Subgenital lamina of male semiorbicular. Styles present."

The five species of the genus belong to the Malayan Archipelago, but Saussure reports the following one from the Australian region :—

PARANAUPHOETA RUFIPES, *Brunner*, Syst. Blatt., 400 ; *Sauss.* (Mel. Orth., II., 154).

"Small, black. Head and antennæ dull black. Pronotum brownish black, bordered with yellow in front and laterally, and two trigonal spots adjoining the hindmargin. Elytra reddish chestnut, base and middle with a yellow spot, foremargin testaceous, discoidal vein with two apical branches. Legs red, base brown. Abdomen brownish testaceous, beneath brownish black. Cerci styliform.

Length of body (male)...	...	17 mm.
Length of elytra ...	...	15 "
Length of pronotum ...	...	3·8 "
Width of pronotum ...	...	6 "

Habitat—Ternate (*Brunner*) ; New Guinea" (*Saussure*).

On a New Land Shell from Central Australia.

By W. T. Bednall.

[Read September 4, 1894.]

Hadra Adcockiana, *sp. nov.*

Shell deeply umbilicated, depressedly globose, thin, shining, surface finely and evenly striated. Whorls four and a-half, flatly but regularly convex; first and second very finely striated under the lens, striations becoming more pronounced with the revolution of the shell; last whorl three-fourths the size of the whole shell, descending slightly in front, constricted at the outer lip; base somewhat flattened; striations extending from the suture to the umbilical region, but becoming much less distinct after crossing the periphery. Suture impressed. Aperture oblique, sub-circular, peristome thickened; outer lip slightly expanded and reflected; columellar margin narrowly expanded, and but partially covering the umbilicus; margins approximating, and connected by a diffused gamboge-colored callus. Color, opaque-white, encircled by two well-defined narrow fuscous bands, one at the upper part of the whorl adjoining the suture, the other just above the periphery; both bands are clearly seen in the interior of the aperture.

Dimensions.—Major diameter, 14 mm.; minor, 12 mm.; altitude, 8 mm.; height of aperture, 7 mm.; length, 7·5 mm.; diameter of umbilicus, 2 mm.

This species appears to occupy an intermediate position between *Hadra Everardensis*, Bednall, of the Everard Range, and the more Southern representative of the genus, *Hadra Lorioliana*, Crosse, of the Flinders Range. It is less conical than the former, and not so depressed as the latter species.

All the specimens—three in number—are perfect, and evidently full-grown. They are in the collection of Mr. D. J. Adcock, and were obtained by Mr. Robert Thornton, of the Tempe Downs Station, early in 1893.

Relative dimensions of the species referred to :—

	Major diam.	Minor diam.	Altitude.	Height of Aperture.	Length of Aperture.	Diam. of Umbilicus.
Lorioliana ...	26	22	14	14	15	—
Adcockiana ...	14	12	8	7	7·5	2
Everardensis...	13	11·5	9·75	6·75	6·75	2·5

Brief Diagnoses of Mollusca from Central Australia.

By Professor Ralph Tate.

[Read October 2, 1894.]

Succinea interioris, *sp. nov.*

Slender, aperture two-thirds the length of the shell, and thus near to *S. scalarina;* but is nearly twice the dimensions. The last whorl is not quite so convex, and the spire is shorter and narrower.

Length, 17; diameters, 9·25 and 6·5. Aperture: length, 11·5; width, 7 mm.

Stenogyra interioris, *sp. nov.*

Similar to *S. gracilis*, Hutton (*S. Tuckeri*, Pfr.), but is more slender, has nine whorls instead of eight in a length of 10·5 mm.; whorls less convex, but the suture more profund; the growth-lines finer, more regular, and closer together.

Length, 10·5; width, about 2·25 mm.

Pupa ficulnea, *sp. nov.*

Similar to *P. australis*, but dextral and smaller; suture more channelled.

Length, 3·5; width, 1·75 (vix).

Pupa Beltiana, *sp. nov.*

A longer and narrower shell than *P. pacifica*, with less convex whorls, rarely sinistral.

Length, 4·5; width, 2·0 (vix); a more slender form 4·5 x 1·5.

Pupa ischna, *sp. nov.*

Sinistral, similar to *P. myoporinæ*, Tate, but more slender, with flatter whorls; more attenuate apically than *P. Beltiana.*

Length, 4·25; width, 1·25 mm.

Pupa eremicola, *sp. nov.*

Like *P. myoporinæ*, but much broader, less attenuate apically; aperture more oblique, peristome largely reflected. Differs from *P. Beltiana* by larger size, less convex whorls, and large umbilicus.

Length, 5·5; width, 2·5 mm.

LIPARUS SPENCERI, *sp. nov.*

Similar to the short and broad variety of *L. melo*, but the test is thin, diaphanous, and dark horn-colored ; the whorls are more convex and abruptly arched at the suture, the aperture slightly oblique and proportionately wider (as in *L. Onslowi*).

Length, 20 ; width, 12·5 ; aperture, 11·5 x 8 mm.

PLANISPIRA HEMICLAUSA, *sp. nov.*

Shell depressed, glossy; spire slightly prominent ; whorls three and a-half, somewhat gradated, distantly and regularly sculptured with spiral incised lines, finely transversely striate ; aperture not deflected, peristome much thickened, continuous all round, the parietal incrassation obliquely in advance and forming a vertical plate half-closing the aperture ; umbilicus about one-third the width of the shell.

Diameter, 1·5 ; height, about ·5 mm.

CHAROPA ÆMULA, *sp. nov.*

Similar to *C. antialba*, Beddome, with the same number of riblets, but apparently inornate in the interstices ; spire slightly sunken ; umbilicus very much smaller, with regularly sloping walls.

Diameter, 2 ; height, ·75 (vix).

CHAROPA RETINODES, *sp. nov.*

Like *C. Mortii*, Cox, but the riblets more frequent, though wide apart, the interspaces regularly reticulate-striate ; last whorl feebly flame-painted, and more depressed ; umbilicus larger ; the young shells not at all angulate.

HADRA WATTII, *sp. nov.*

Its only ally is *H. leucocheila*, from the unicolorous variety of which it differs, particularly, by more numerous very narrow whorls (six and a-half), smaller size, and very small umbilicus, not at all concealed by the columella.

Diameters, 10·5 and 9·25 ; height, 5·5.

HADRA SUBLEVATA, *sp. nov.*

Has the general appearance of *H. Eyrei*, but with five narrower whorls of less rapid increase, and scabrous-granulate surface ; lips callously united, outer lip largely reflected, deeply constricted basally, producing a conspicuous elevated ridge within the aperture (thus resembling *H. Wesselensis*) ; umbilicus large, 2·5 mm. wide.

Diameters, 15 and 14 ; height, 8.

HADRA SQUAMULOSA, *sp. nov.*

Very much like *H. Evandaleana* and *H. Victoriæ*, with the periphery rounded; last whorl slightly descending at the front, outer lip slightly reflected; surface densely covered with hispid scales, arising from elongate granular-like bosses.

Diameters, 15 and 12·5; height, 9·5; umbilicus, 3 mm. wide.

HADRA GRANDITUBERCULATA, *sp. nov.*

Globosely conical, slightly flatted at the suture, plicately striated with close, large, scabrous tubercles, a color-band at the suture, a broader one at the periphery, and a still broader one beneath; peristome entire, slightly reflected all round, obliquely subrotund; umbilicus wide and deep.

Diameters, 17 and 14; height, 13; longer diameter of aperture, 10 mm.

HADRA CLYDONIGERA, *sp. nov.*

Similar to *H. Silveri*, but without the angulation at the suture and periphery; costæ more compressed and uninterrupted; last whorl more descending at the front; outer lip more abruptly reflected.

Diameters, 16 and 14; height, 11·5 mm.

HADRA ARCIGERENS, *sp. nov.*

Has the general aspect of *H. Bordaensis*, but flatter, and less angulated; ornamented with elevated, compressed, arched ribs (about 40 on body whorl), the interspaces densely granulated; there are three faint color-bands on body-whorl; peristome slightly deflected posteriorly, entire, slightly reflected all round.

Diameters, 18 and 15; height, 8; width of umbilicus, 4.

HADRA WILPENENSIS, *sp. nov.*

Has the external features of *H. fodinalis*, except the ornament, which is that of *H. crytopleura*; plicæ rather stout and elevated, about 70 on body-whorl, interspaces apparently without granules.

Diameters, 16 and 14; height, 12·5.

Collected by the late Mr. Tomsett at Blackfellow's Creek, six miles east of Wilpena Pound.

HADRA OLIGOPLEURA, *sp. nov.*

Similar to *H. crytopleura*, but the plications sharper, higher, and about one-third less in number (35 to 40); the outer lip is thin, and the whorl is more constricted behind it.

Diameters, 14·5 and 12; height, 8; height of aperture, 6 mm.

Eyre's Sand-Patch, 160 miles west from Eucla, W.A. (Received through Mr. Adcock.)

HADRA SETIGERA, *sp. nov.*

Similar to *H. cyrtopleura*, but with slender, crowded, arched growth-lines, and covered by a thin brown periostracum, which is raised into short bristles coincident with the arched ridges; whorls more convex, and suture more impressed.

Diameters, 13·5 and 11; height, 6; diameters of umbilicus 5 and 4·5 mm.

HADRA EUZYGA, *sp nov.*

Similar to *H. setigera*, but the spire is flattened, the last whorl more depressed, and the rows of bristles more distant; also like *H. cyclostomata*, but the spire is flat and the aperture more descending and entire.

Diameters, 8 and 7; height, 3 mm.

HADRA WINNECKEANA, *sp. nov.*

Similar to *H. euzyga*, but apparently without bristles, the arched growth-lines close and exceedingly fine.

Diameters, 5 and 4·5; height, 2 mm.

HADRA PAPILLOSA, *sp. nov.*

Differs from other members of the "Angasella group" by its elevated spire; surface with coarse and somewhat interrupted arched plicæ, which bear distant large depressed papillæ; last whorl much descending, peristome largely reflected and entire; umbilicus one-third the width of the base.

Diameters, 13·5 and 11; height, 8·5 mm.

Notes on the Organic Remains of the Osseous Clays at Lake Callabonna.

By Professor Ralph Tate.

[Read September 5, 1893.]

The stratum in which the diprotodon and associated vertebrate fossils are found is a blue tenacious clay, though containing about 12 per cent. of sharp quartz-sand, as determined by mechanical separation. Overlying the blue clay is a sand, which constitutes a fringe to the lacustrine plain, and appears as islets dotting its surface. Lake Callabonna is now a salt-pan, but is occasionally submerged, either as the result of heavy local rains or by the superfluous water of Cooper Creek, reaching it by way of Strzelecki Creek and Lake Blanche.

Anxious to learn something of the physical conditions which prevailed at the time when the diprotodons inhabited this area, I have minutely searched the clay and sand, obligingly placed at my disposal by Dr. Stirling and Mr. Zeitz, for their organic contents, with the following results :—

The clay has yielded two cones of the smooth-valved form of *Callitris robusta*, R. Brown, the living sandarach-pine, so widely distributed in Australia, and certainly an inhabitant of its "dry zone;" oospores of characeous plants, probably of two species, one of which I refer with a doubt to *Chara Braunii;* fragments of a small gastropodous shell, probably of the genus *Potamopry-gus.* The charas and the mollusc are aquatic in habit, and may have endured a brackish water medium. The sand has furnished a new species of *Blanfordia*, *B. Stirlingi*, *Melania lutosa*, *Corbicula desolata*, which occurs in a living state in Cooper Creek, a cypris-like ostracod, and the charas above-mentioned. The Blanfordia is related to *B. striatula*, an inhabitant of brackish waterpools on the coastal tracts of Southern Australia; but this alliance does not forbid a strictly fresh-water habit, which is implied by the association with *Corbicula* and *Melania*, though it may indicate an increased salinity of the lake-waters prior to their final dessication. Indeed, it is not at all improbable that all lived in the lake while its waters were fresh, that the *Corbicula* and *Melania* succumbed when the water became brackish, and that the *Blanfordia* was unaffected by the change, but became extinct through failure of the essential medium. The sand contains also small cylindrical tubes, about one millimetre diameter, which recall agglutinated-sand cases such as are constructed by some may-

flies. However, they are freely soluble with effervesence in acid, and are, therefore, probably the calcified shapes of rootlets, which from their small and uniform size may have belonged to a cyperaceous or graminaceous plant.

BLANDFORDIA STIRLINGI, *spec. nov.*

Shell thin, subpellucid, of a pale flesh color, oval in outline, spire conical, apex obtuse or subacute, and slightly mammillated; whorls six, rather rapidly increasing in size, moderately convex, but more rapidly declinous posteriorly, ornamented with slightly arched striæ of growth, and in a spiral direction by a few threads. Aperture slightly oblique, inclining towards the columella; peritreme entire; columella effusively dilated over the umbilicus and basally. Umbilical fissure narrow, concealed by the columellar dilatation; young shells imperforate. Operculum pellucid, its exterior face deeply concave; nucleus subcentral, growth-lines slender, rather numerous, not coarse, few, and elevated as in *B. striatula.*

Length, 6·5; width, 4·75; height of aperture, 3 mm.

The short spire, more rapidly increasing whorls, not closely spirally lined, the more oblique aperture, and effuse inner lip distinguish this species from *B. striatula.* *B. Stirlingi* has not a decollated spire, as is usual with its congener, but when the apical whorls are present in the latter they are of more regular increase.

I do not know if *B. Stirlingi* be actually living, though it may possibly be so, as though all of the very numerous examples under observation, excepting one, are bleached and very fragile; yet the unique exception shows slight coloration, the test being unaltered, and it contained an operculum.

I bestow on this modest shell the name of my colleague, who has so largely promoted the exploitation of the extinct vertebrates in the region of its occurrence.

Var. MAMMILLATA.

Similar to *B. Stirlingi*, but short and squat, somewhat resembling a *Bithynia.* Whorls five and a-half, the antepenultimate or penultimate suddenly increasing in size, and flatted at the suture, so that the posterior part of the spire appears mammillated.

Dimensions.—Length, 5·25; breadth, 3·5; height of aperture, 2·75 mm.

Locality.—On the shore of a dry salt lake near Nannine, Murchison Goldfield, W.A., in great abundance *(Mr. Victor Streich).* A few examples at Lake Callabonna.

Notes on the Sedimentary Rocks in the MacDonnell and James Ranges.

By Charles Chewings, Ph. D., F.G.S.

[Read June 5, 1894.]

The object of the present paper is to point out, what I believe to be, an error the Government Geologist, Mr. H. Y. L. Brown, has made in the reading of the Sedimentary Rocks composing the MacDonnell and the James Ranges; the area lying principally within the watershed of the Finke River and its tributaries. I refer to Mr. Brown's report to the Commissioner of Crown Lands, 1892, and entitled "Further Geological Examination of Leigh's Creek and Hergott Districts, &c." (Page 7, with ideal section).

The stratigraphy of the MacDonnell and Ranges lying to the south has already received some attention, but its importance has not been so generally realised as perhaps it warrants. The time has arrived for definitely fixing on the most typical areas of exposures and development for purposes of reference; and I will endeavor to indicate the best as known to me, and then state very briefly where I believe Mr. Brown is in error.

Foundation Rocks (Archæan of Brown).

The most typical area is the north side of the MacDonnell Range. These rocks are composed of gneisses, various schists, dynamometamorphic granite, crystalline limestone, &c.; generally disposed at steep angles, and over large areas are quite vertical. Into this series granite and diorite, &c., have been intruded. Strike east and west.

Glen Helen Series (Cambrian and Pre-Cambrian [?]).

The valley in which Glen Helen Station stands is a good typical area; it is situated in the MacDonnell Ranges, at the head of the Finke River. The principal rocks are quartzite, blue crystalline limestones, dolomite, and clay, slate, &c., usually with a dip of 70° to 90°. Quartzite is the lowest stratum, and rests unconformably on the "Foundation Rocks." These are found largely developed in the so-called South MacDonnells, and in other ranges, and they rise through the eroded Lower Silurian anticlinals in several places, *e.g.*, on the Petermann Creek. These rocks are generally seen to be nearly or quite vertically disposed, but are not always so. Strike generally east and west. In the quartzites on the north side of Mareeno Bluff

Pass annelide burrows are numerous. These rocks may be Cambrian, and if so, these are the only traces of organic remains yet discovered in this series.

Mareeno Bluff Series (Lower Silurian in part).

A good typical section and area occurs at Mareeno Bluff, in the western part of the South MacDonnells, but these rocks have a large development in the James', Gardiner's, Geo. Gill's, Levi's, and other Ranges, and good typical areas exist at the heads of the Walker and Petermann Creeks and elsewhere. This series is composed from below upwards of red shale, then black and green shale, with fossiliferous bands of limestone, which, according to Etheridge, are of Lower Silurian age. This is conformably followed by a great development of red and white sandstones, with quartzite bands in places. The limestones and shales vary in thickness in different localities. This is, perhaps, the most important and widespread series of Palæozoic rocks in Central Australia. At Mount Palmer, in the Western MacDonnell, and on many of the eroded Silurian anticlinals, the unconformability of this series to the "Glen Helen Series" is apparent, and generally very marked. The strike is generally east and west, and the dip varies from 0° to 90°.

Walker's Creek Series (Devonian [?]).

This series of rocks has excellent typical sections at several places along the course of the Walker Creek, west of the Tempe Downs Station, in the James Ranges. The formation is generally confined, as it is at this place, within the synclinal folds of the Silurian Rocks (Mareeno Bluff Series), and would have long since been eroded quite away in many places but for the protection the Silurian and Cambrian trough edges have afforded; as it is, these rocks have been worn back for long distances from the older rocks. This Walker's Creek Series is composed of red mudstone and red and green shales, conformably overlaid by ferruginous sandstone, each being several hundreds of feet thick. The unconformability of this series to the Mareeno Bluff Series is very marked, as may be seen in many places along the Walker, as stated above. These rocks are sometimes seen in isolated patches resting unconformably on the highly or vertically inclined ridges of the Silurian and Cambrian Series.

Conclusions.

I agree with Mr. Brown in the what he terms the Archæan Rocks, they are the foundation rocks of Central Australia; but instead of three series of Palæozoic Rocks, he only admits two. He includes part of, if not the whole of, the Mareeno Bluff

(Lower Silurian) Series in the Cambrian division, viz., in the Finke Gorge set of rocks, commonly called the South MacDonnells. If I am not mistaken, some part of the Walker's Creek Series (Devonian ?) may be found there in places as well. He fails to detect any unconformability between the Walker's Creek Series and the Mareeno Bluff Series. He does not discriminate the one from the other, and, what is more serious, states that the fossils of Lower Silurian age that have been found in the district at such places as Mareeno Bluff, heads of the Walker and Palmer Creeks, Levi's Range, and elsewhere have been found in the Upper Series. As a fact, they have only been found in the Middle or Mareeno Bluff Series. No fossils have as yet been found in the Upper or Walker's Creek Series.

In the paragraph "Lower Silurian Rocks" the description and dip of the rocks occurring at the Lutheran Mission Station are correct, but to class them as part and parcel of the Lower Silurian Rocks is quite wrong. They belong to the Upper or Walker's Creek Series, and not to the fossiliferous Lower Silurian Series, on which they rest unconformably. By failing to recognise this fact the paragraph is quite misleading. To discuss the errors Mr. Brown's reading would lead to in interpreting such Ranges as the James', Gardiner's, Geo. Gill's, and Levi's is needless. Suffice it to say that the Upper or Walker's Creek Series extends from north of the Mission Station, southwards (with one interruption) to near Parkes's Running Water, and east and west of that line for many miles; but south of the latter point Silurian and Cambrian rocks are more generally met with.

Mr. Brown is in error in stating that the upper series forms the George Gill's Range. That range is composed of Silurian Rocks in the main, but at the western end the Walker's Creek Series are seen to overlie the Silurian Rocks unconformably. I make this latter statement with hesitation, because I had not time to verify my impressions as to the Devonian being there, but think I may without much risk venture so far. The southern portion of the James' Ranges is composed chiefly of Silurian and Cambrian, not of the Walker's Creek Series of rocks. Until Ooraminna Cliff is proven to belong to the Walker's Creek Series it is better, in my opinion, not to connect the Walker's Creek (Devonian ?) Series and the Ooraminna Cliff Rocks together, because the Ooraminna Sandstone may turn out to be Silurian, and not, as has been supposed, of Devonian (?) age. There is a resemblance in the lithological character and in the bold headlands, which is a characteristic of both the Upper or Walker's Creek Series (Devonian ?) and the Lower Silurian or Mareeno Bluff Series, and I have no doubt it was this striking similarity that led Mr. Brown into error.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October, 2, 1894.]

XVI.

CARABIDÆ.

LITHOSTROTUS (gen. nov. *Lebiidarum*).

Mas. Corpus pilis erectis vestitum; caput minus elongatum; oculi parvi (orbitu postoculari sat dilatato fere ultra oculum exstanti); palporum labialium articulus ultimus fortiter securiformis; mentum medium haud dentatum; antennarum articulus 3us glabrer; prothoracis margo posticus fortiter lobatus; elytra postice oblique subtruncata; tarsi supra glabri, articulo 4° breviter emarginato; unguiculi basin versus serrati; tarsorum anticorum articuli 3 subtus squamulati.

The small *Lebiid* for which I propose this generic name is not much like any other known to me, and I hardly know where to place it in the sub-family; perhaps its structural characters point to an alliance with *Diabaticus*.

L. cœrulescens, sp. nov. Modice elongatus, capite quam prothorax vix angustiori; sat nitidus; nigro-cœruleus, antennis rufopiceis, tibiis rufis; supra pilis erectis minus crebre vestitus; antennis sat robustis prothoracis basin vix superantibus; capite prothoraceque fortius minus crebre punctulatis; hoc leviter transverso, canaliculato, anguste marginato, cordato, antice subtruncato, angulis posticis acutis dentiformibus; elytris subovatis minus convexis, fortiter striatis, interstitiis grosse seriatim punctulatis (sicut interstitia in tubercula planata divisa videntur). Long., 2 l.; lat., $\frac{4}{5}$ l.

The very peculiar sculpture of the elytra renders this species easily recognisable. The seriate punctures in the interstices are so coarse as to equal the width of the interstices themselves, which are thus interrupted at short intervals, so as to present the appearance of the surface of the elytra being tessellated by almost similar longitudinal and transverse striæ; or the appearance might be described as that of the interstices consisting of series of small square flat tubercles.

Victoria; Alpine District.

ECTROMA.

E. parvicolle, sp. nov. Oblongum, postice paullo latius; testaceum elytris postice et segmento ventrali apicali infuscatis, prothorace obscure fusco-cincto et in medio fusco-bivittato; antennarum articulo basali 3° subbreviori; prothorace parvo sat transverso, antice subtruncato quam postice vix angustiori, lateribus parum arcuatis postice nullo modo sinuatis, angulis posticis sat rotundatis; elytris striatis. Long., $2\frac{4}{5}$ l.; lat., $1\frac{1}{5}$ l.

As both the specimens that I have seen of this insect are females, there is a *possibility* that the discovery of the male might involve its removal from *Ectroma*, although it appears so evidently congeneric with the females of the species previously attributed to the genus that I do not think there is any danger in placing it with them. It is not unlike, in color and markings, *E. obsoletum*, Blackb., and has somewhat the appearance of a washed-out specimen of *Sarothrocrepis corticalis*, Fab. It may at once be distinguished, however, from *E. obsoletum*, and from the others previously described of the genus by its comparatively small prothorax, the sides of which are not at all sinuate behind, while the hind angles are extremely obtuse—almost rounded off.

W. Australia; sent by Mr. French.

AGONOCHEILA.

A. perplexa, sp. nov. Ferruginea, capite prothoraceque rufescentibus, elytrorum sutura et vitta submarginali (hac postice dilatata) infuscatis; prothorace fortiter transverso, antice parum emarginato, angulis anticis rotundatis posticis obtusis, lateribus sat fortiter arcuatis mox ante medium subangulatis postice vix sinuatis; elytris fortiter crebre (fere ut *A. cribripennis*, Chaud., sed paulo magis crebre) punctulatis, distincte striatis; maris tarsorum anticorum articulis modice dilatatis. Long., $2\frac{1}{2}$ l.; lat., $1\frac{1}{10}$ l.

This species is easily recognisable by the puncturation of the elytra being as strong and coarse as, but evidently closer than, in *A cribripennis*, Chaud., while its elytra are about as distinctly striate as those of *A. curtula*, Er., and its prothorax scarcely differs from that of the latter species except in being slightly less transverse, and with hind angles slightly less defined.

Victoria.

SCOPODES.

S. simplex, sp. nov. Ovalis; nigro-cœruleus; capite supra longitudinaliter sat fortiter striolato; prothorace quam caput angustiori, supra leviter striolato, modice transverso, angulis posticis obtusis bene determinatis, latitudine majori mox pone marginem anticum posita, lateribus postice sinuatis

antice subangulatis ; elytris minus sericeis, striatis, interstitiis convexis (3° 3-punctato). Long. $2\frac{1}{2}$ l.; lat., 1 l. (vix).

Easily distinguishable by its uniform dark-blue color and by the absence of the appearance of silky tessellation on the elytra. These characters give it somewhat the general aspect of a *Catascopus*, but it seems to be a true *Scopodes*. The shape of the prothorax is more like that of *tasmanicus* than of any other species known to me, but the segment is less transverse than in *tasmanicus*, and is considerably more narrowed behind, with more explanate hind angles.

Victoria ; on the higher mountains of the Alpine Range.

S. intermedius, sp. nov. Ovalis vel leviter ovatus ; nigro-sericeus, elytris tessellatis, pedibus antennarumque basi luridis, illis plus minusve fulvo-variegatis ; capite supra longitudinaliter sat fortiter striolato ; prothorace quam caput angustiori, supra crebre sat distincte nec ordinatim striolato, modice transverso, angulis posticis sat fortiter dentiformibus, latitudine majori mox pone marginem anticum posita, lateribus ante medium fortiter angulatis (angulis subdentiformibus) ; elytris striatis interstitiis convexis sinuato-subinterruptis (3° 3-foveolato). Long., 2—$2\frac{2}{5}$ l. ; lat., $\frac{9}{10}$—1 l.

This species has much the appearance of *S. sigillatus*, Germ., from which it differs chiefly by its considerably larger size and darker color, and by the much greater convexity of its elytral interstices (including the suture).

Tasmania ; sent to me by A. Simson, Esq.

S. flavipes, sp. nov. Ovalis ; sat nitidus ; æneo-subauratus, sericeus, elytris plus minusve tessellatis, antennis pedibusque (tarsis vix infuscatis) flavo-testaceis ; capite supra longitudinaliter striolato ; prothorace quam caput angustiori, supra crebre subtiliter nec ordinatim striolato, modice transverso, angulis posticis sat fortiter dentiformibus, latitudine majori mox pone marginem anticum posita, lateribus ante medium fortiter angulatis (angulis subdentiformibus) ; elytris striatis, apice suturali subproducto, interstitiis vix convexis (3° 3-foveolato). Long., 2 l. ; lat., $\frac{7}{10}$ l.

This species is another ally of *sigillatus*, compared with which it is a little larger, and more nitid, with a more golden tone of color ; with legs and antennæ entirely yellow except a slight infuscation of the tarsi. The prothorax resembles that of *sigillatus*, except in the base being differently shaped ; in *sigillatus* the hinder edge of the projecting hind angle runs *obliquely* hindward and inward so that the outline of that part of the prothoracic margin which is in front of the projecting hind angle is continued almost in the same direction for a short distance

behind the hind angle, while in the present species the hind margin of the hind angle runs directly inward almost at right angles to the general lateral outline of the prothorax. The elytra are very like those of *sigillatus*, but with the interstices scarcely so convex, and the sutural apex evidently more produced.

S. Australia.

CYCLOTHORAX.

C. cinctipennis, Blackb. This species seems to be identical with that described by Castelnau under the name *Phorticosomus lateralis*, and must, therefore, stand as *Cyclothorax lateralis*, Cast. It has nothing to do with *Phorticosomus*.

HYDROPHILIDÆ.

PARACYMUS.

P. (*Cyclonotum*) *pygmæus*, Macl. I have recently received examples (compared with the type) of this insect from Mr. Lea. They seem certainly identical with *Paracymus* (*Hydrobius*) *nitidiusculus*, Brown. Macleay's is the older name.

STAPHYLINIDÆ.

PHILONTHUS.

P. sanguinicollis, Fauv. This species (from comparison with a type of Macleay's species sent to me by Mr. Lea) is identical with *Philonthus subcingulatus*, Macl., and must, therefore, become a synonym as Macleay's is the older name.

SCOPÆUS.

S. ruficollis, Fvl. This insect is probably, judging by Fauvel's description, identical with that described by Macleay as *Stilicus ovicollis*. I have recently obtained from Mr. Lea an example of the latter that has been compared with Macleay's type, and it is certainly a *Scopæus*. Macleay's is the older name.

NITIDULIDÆ.

BRACHYPEPLUS.

B. Haagi, Reitter, seems to be identical with *B. Murrayi*, Macl., of which Mr. Lea has sent me an example compared with the type. Reitter's description is too brief for absolutely certain identification, but the specimen of *B. Murrayi* agrees well with it as far as it goes. Both are founded on examples from Queensland. Macleay's is the older name.

CARPOPHILUS.

C. excellens, Reitter, is probably identical with *C. luridipennis*, Macl., of which Mr. Lea has sent me an example compared with the type. Macleay's is the older name.

MACROURA.

M. Baileyi, Blackb. This species seems to be indentical with *M.* (*Carpophilus*) *obscurus*, Macl., of which Mr. Lea has sent me an example compared with the type. Macleay's is the older name.

MYCETOPHAGIDÆ.

DIPLOCŒLUS.

D. Leai, sp. nov. Sat late ovalis ; brunneus, pilis elongatis concoloribus erectis vestitus ; capite cum prothorace sparsim sat fortiter punctulato ; hoc quam longiori fere duplo latiori, utrinque profunde longitudinaliter bisulcato (sulco interno basin versus late dilatato), in medio canaliculato (canali basin versus dilatato), antice et postice bisinuato, ad basin inæqualiter marginato, angulis posticis sat acutis ; elytris vix manifeste striatis, longitudinaliter seriatim punctulatis, puncturis in seriebus alternis his majoribus illis minoribus ; segmento basali ventrali in medio oblique bistriato ; antennarum clavæ articulo 1° quam 2us vix angustiori. Long., 3½ l. ; lat., 1½ l.

Very distinct by its large size and the long erect pilosity with which it is clothed, the very strongly impressed sulci of its upper surface, &c.

N.S. Wales ; taken by Mr. Lea.

LAMELLICORNES.

TEMNOPLECTRON.

T. diversicolle, sp. nov. Rotundato-ovatum ; convexum ; nigrum, obscure viridi-micans, pedibus rufescentibus, antennis palpisque testaceis ; capite sat æquali vix planato vix manifeste punctulato, margine antico in medio bidentato ; prothorace sublævi, quam longiori fere duplo latiori, sat convexo; lateribus antice subito oblique convergentibus pone medium vix manifeste marginatis, angulis anticis acutis (posticis rotundatis); elytris convexis lævibus, obsoletissime 7-striatis et striis distinctis nonnullis (his postice abbreviatis) in parte laterali quasi-epipleurali. Long., 3⅕ l.; lat., 2½ l.

This species is at once distinguished from the three known to me of those previously described as occurring in Queensland by the absence of a continuous reflexed margin to the prothorax. An extremely fine carinated edge is barely traceable for a short distance from the base, and is followed by an interval in which the prothorax has no trace whatever of a reflexed margin. The fourth Queensland species (*T. politulum*, Macl.) I have not seen, and its author has not characterised the structure of its prothoracic

margin; but it is evidently distinct from the present insect, as its size is given as much smaller (long., $2\frac{1}{4}$ l.), and its head is said to have a "small sharp notch on either side under the eyes," which is not present in the specimen before me. Besides the Queensland species three from Western Australia have been described by Sir W. Macleay as attributable to this genus; they, however, are very different from the Queensland species, and perhaps not genuine members of *Temnoplectron*, as two of them are said to have the clypeus "sex-dentate in front;" and the other (scarcely described) is a very minute species (long., 1 l.). The examples on which this description is founded are females. Probably the sexual characters of the male are very similar to those in the other species of the genus.

N. Queensland.

RHOPÆA.

R. callabonnensis, sp. nov. Sat elongata; pubescens, capite inter oculos prothorace sternis (his densissime) pygidio pedibusque longe villosis; rufescens vel flavo-brunneus; clypeo (hoc fortiter concavo) et capite postice sublævibus; capite inter oculos crassissime ruguloso; prothorace quam longiori (et postice quam antice) duabus partibus latiori, minus crebre subfortiter punctulato, lateribus crenulatis angulis posticis obtusis; elytris subcrasse rugulosis, obsolete 4-costatis.

Maris antennarum flabello elongato 7-articulato. Long., 11 l.; lat., $5\frac{1}{4}$ l.

Differs from all its previously described congeners except *R. Mussoni*, Blackb., by its much coarser sculpture. From *Mussoni* it may be at once distinguished by the antennal flabellum of the male having seven equal joints, by the deeply concave and almost impunctulate clypeus, &c.

S. Australia; taken by Mr. Zietz near Lake Callabonna.

ZIETZIA (gen. nov. *Macrophyllidarum*).

Mas. Mentum sat planum, antice sat truncatum; maxillæ modicæ, loba externa dentata; palpi labiales breves, articulo apicali ad apicem obtuso; palpi maxillares elongati, articulo apicali quam ceteri conjuncti sublongiori supra longitudinaliter impresso; labrum perpendiculare haud emarginatum; antennæ 10-articulatæ, clava 8-articulata arcuata quam stipes quintuplo longiori; elytra (vix seriatim) punctulata, vix distincte costulata; coxæ anticæ transversæ; pedes modici, tarsis haud dilatatis, unguiculis simplicibus.

This genus may be at once distinguished from nearly if not quite all other *Melelonthid* genera by the following characters in combination:—Claws simple, antennæ 10-jointed, with an 8-jointed club. It is no doubt allied to *Holophylla* and *Othnonius*.

Z. geologa, sp. nov. Oblonga; sat parallela; vix nitida; testaceo-brunnea; clypeo subverticali profunde concavo; capite inter oculos grosse ruguloso et breviter hirsuto postice in medio lævi; prothorace fortiter transverso sat grosse sat crebre punctulato, lateribus fortiter rotundatis, angulis anticis obtusis minus productis posticis subrectis; scutello fere ut prothorax, elytris magis grosse magis rugulose, punctulatis; pygidio minus verticali, sat gibboso, sat obscure punctulato; corpore supra setis pallidis brevibus (his singulis in puncturis singulis positis) vestito; corpore subtus antice longe postice minus perspicue hirsuto. Long., 8 l.; lat., 4 l. (vix).

This species is evidently much like *Holophylla furfuracea*, Burm., in general appearance; but as its antennæ, claws, and abdomen all differ in most important characters from those of *H. furfuracea* as Burmeister describes them, it can have nothing to do with that genus. As I have previously pointed out to the Roy. Soc. S.A. (Tr., 1867, p. 211), Burmeister and Erichson differ *inter se re* the abdominal character of *Holophylla*, which cannot be a member (if the former is reliable) of the *Macrophyllides*. Indeed, he distinctly says it is not. If he is wrong, and if moreover the antennal discrepancies were disregarded, on the supposition that both authors might have mistaken a female for a male, there would still remain the fact that both authors describe the claws as dentate, and that is a discrepancy which cannot be evaded.

S. Australia; taken by Mr. Zeitz near Lake Callabonna.

ANOPLOGNATHUS.

A. quadrilineatus, Waterh. This species is clearly identical with *A. abnormis*, Macl. Macleay's is the older name.

CORYNOPHYLLUS.

C. melas, Fairm. This species seems from the description quite indistinguishable from *C. Haroldi*, Shp., and is doubtless identical with it. Dr. Sharp's is the older name.

ISODON.

I. (Cheiroplatys) pecuarius, Reiche. This insect is certainly, I think, an *Isodon*. *I. subcornutus*, Fairm., is almost certainly identical with it. Reiche's is the older name.

MICROVALGUS.

M. scutellaris, sp. nov. Nigro-piceus, squamis albis (nonnullis piceis intermixtis) vestitus, antennis palpis prothorace (maculis nonnullis exceptis) elytrisque ferrugineis; prothorace quam longiori vix latiori, obscure squamose punctulato, antice sat angustato, angulis anticis acutis sat fortiter

productis posticis obtusis; elytris vix perspicue punctulato-striatis. Long., $1\frac{4}{5}$—$2\frac{1}{5}$ l.; lat., $\frac{9}{10}$—1 l.

This species is much like *M. Lapeyrousei*, L & G., but differs from it by larger size, dark-piceous color of scutellum, and mixture among the whitish scales of the upper surface of an almost equal proportion of *dark* scales.

N.S. Wales.

BUPRESTIDÆ.

CYPHOGASTRA.

C. Macfarlanei, Waterh. Mr. French has lately received a specimen taken in the Endeavour River District of N. Queensland apparently referable to this species (which was founded on an example from Murray Island in Torres Straits). Mr. Waterhouse's description consists merely of a few lines briefly indicating the differences between *C. Macfarlanei* and *C. venerea*, Thoms., so it is difficult to feel quite sure in identifying his insect, but certainly the differences between the specimen from N. Queensland before me and *C. venerea* seem to be almost exactly those Mr. Waterhouse specifies. The only discrepancy I observe is that whereas Mr. Waterhouse says *Macfarlanei* has "indications of a small impression below the shoulder," the elytra of Mr. French's insect present a *very distinct* impression *within* (rather than below) the shoulder—indeed, it is nearer to the suture than to the shoulder, but I do not think this quite sufficient distinction to warrant the bestowal of a new name.

METAXYMORPHA.

M. gloriosa, sp. nov. Nitida; modice elongata; modice angusta; splendide cœrulea, elytris (macula communi suturali apicali cœrulea et marginibus lateralibus sanguineis exceptis) testaceis; capite longitudinaliter leviter sulcato, minus fortiter vix crebre punctulato; prothorace fere ut caput punctulato, pone marginem anticum transversim impresso, lateribus leviter arcuatis, latitudine majori trans basin posita; elytris ad apicem 3-spinosis, sat fortiter striatis, striis sat subtiliter sat crebre punctulatis, interstitiis subplanis distincte sat crebre punctulatis; corpore subtus (sternorum lateribus punctulatis exceptis) fere lævi; segmento ventrali apicali (maris ?) late triangulariter emarginato. Long., 13 l.; lat., $5\frac{1}{2}$ l.

This extremely fine and interesting new species of *Buprestidæ* has lately been received from N. Queensland by Mr. French. Apart from its totally different coloring and markings, it differs from *M. Grayi*, Parry, *inter alia* by the regular striation of its elytra. The cyaneous patch at the apex of its elytra, which is

their only marking, is of the same shape as the corresponding patch in *Stigmodera amabilis*, L. and G. (as figured Tr. Ent. Soc., 1866, t. 3, fig. 1), except that its external front angle is rounded off. The elytra have the same peculiar shape as those of *M. Grayi* in the front of their external margin, being obliquely sloped so as to continue the line of the external margin of the prothorax. The apical spines of the elytra are as in *M. Grayi*.

Semnopharus apicalis, v.d. Poll., appears to be a *Metaxymorpha* and to resemble the present insect; but it is evidently quite different, as the apical spot on its elytra is described as of different shape, its abdomen is said to be of fulvous color, and its elytral interstices impunctulate.

N. Queensland.

MALACODERMIDÆ.

XANTHEROS, *Fairm.*

I cannot see anything in M. Fairmaire's diagnosis of this genus inconsistent with its identity with either *Metriorhynchus* or *Trichalus* with which its author does not even compare it. I have an insect from Queensland which, as a species, agrees so well with the description of *X. nubicollis*, Fairm., that I can hardly doubt its being identical, and it certainly appears to be a *Trichalus*. *Metriorhynchus* and *Trichalus* cannot, in my opinion, be satisfactorily treated as generically distinct.

ATTALUS.

I do not think that the two Australian species which have been attributed to this genus (*abdominalis*, Er., and *australis*, Fairm.), are satisfactorily placed there. *Attalus* is distinguished (among the *Malachiides* with 11-jointed antennæ) by its possessing elongate lamellæ on its claws and having the second joint of its anterior tarsi in the male prolonged over the next two joints. In my collection are two *Malachiides* (from Tasmania and N.S.W., the localities from which the two species were described) which agree so well with the descriptions of *A. abdominalis* and *australis* that I can hardly doubt their being those species; but they do not present the special characters just mentioned, and, moreover, present a character that in itself seems to require their separation from *Attalus*—viz., the diminutiveness of the basal joint of the tarsi. I cannot ascertain that any genus has been named to which these species can be referred and therefore propose a new name for them, treating, however, a new species as the type of the genus to provide against the possibility of my not having correctly identified *abdominalis* and *australis*.

HYPATTALUS (gen. nov., *Malachiidarum*).

Palpi breves, articulo ultimo obconico; labrum transversum; caput sat breve; antennæ ad capitis latera insertæ, minus

elongatæ, 11-articulatæ, intus serratæ, articuli 2° parvo 3°-10° inter se plus minusve æqualibus, 11° longiori; prothorax modicus; elytra sat elongata abdomen tegentia; pedes sat elongati; tarsi modici, articulis basali vix distincto, 2° elongato, 3° 4°que brevibus; unguiculi parvi appendiculati.

This genus is sufficiently characterised among Australian genera as a *Malachiid* (having exsertile vesicles well developed), but with tarsi having their joints proportioned as (and much resembling) those of a *Clerid*.

H. punctulatus, sp. nov. Nitidus; pilis erectis minus crebre vestitus; niger, prothorace et abdominis parte mediana rufis, elytris obscure cyaneis testaceo-micantibus, antennarum articulis basalibus subtus pedibusque (plus minusve late) testaceis; capite sublævi, fronte impressa; antennis quam corporis dimidium vix brevioribus; prothorace fortiter transverso sublævi; elytris in disco distincte sat crebre antice et apicem versus obsolete punctulatis. Long., $1\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

The legs vary in color, being in some examples testaceous, with only the base of the femora and the tarsi infuscate; in other examples almost entirely infuscate. At once distinguishable from *Attalus abdominalis*, Er., and *A. australis*, Fairm. (which I believe to be congeneric), by its considerably larger size and the different color of its elytra, which are of a pale-bluish color, with a testaceous gloss. Its distinctly punctulate elytra also separate it from *abdominalis*, and the scarcely defined sutural edging of its elytra from *australis*, in which (if I have identified it correctly) the suture is defined by a well-marked fine elevated line.

S. Australia; Eyre's Peninsula.

H. elegans, sp. nov. Nitidus; pilis erectis vestitus; colore præcedenti simillimus, elytris læte cœruleis et pedibus totis nigris exceptis; capite sublævi, fronte utrinque longitudinaliter impressa; antennis quam corporis dimidium paullo longioribus; prothorace minus fortiter transverso, sublævi; elytris in disco subfortiter minus crebre antice et apicem versus magis sparsim magis obsolete punctulatis. Long., 2 l.; lat., $\frac{9}{10}$ l.

The comparatively large side of this species renders it incapable of confusion with *Attalus abdominalis*, Er., and *A. australis*, Fairm., and its elytra are punctured much more evidently than in the former, and much more sparsely than in the latter of them. From *H. punctulatus* it differs by the color of its elytra—a brilliant metallic blue—and legs (though it is quite possible the latter may be variable), by the presence of a well defined fine sutural

edging of the elytra, by the larger and sparser punctures on its elytra, and by its less transverse prothorax.

N.S. Wales; Blue Mountains.

TENEBRIONIDÆ.

CESTRINUS.

C. Championi, sp. nov. Oblongus; piceo-niger, setis brevibus adpressis aureis sparsim vestitus; capite minus brevi, fortiter subrugulose punctulato; antennis prothoracem superantibus apicem versus leviter incrassatis; hoc leviter transverso, minus crebre (quam caput paullo minus fortiter) punctulato, antice arcuato-emarginato quam postice angustiori, postice in medio late leviter lobato, lateribus arcuatis postice leviter sinuatis, angulis posticis acute rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis quadratis sat magnis, interstitiis subconvexis rugulosis; maris tibiis anticis pone apicem intus late leviter emarginatis, tarsis anticis leviter dilatatis. Long., $5\frac{1}{2}$ l.; lat., 2 l.

Larger than any previously described species of the genus except *Bidwelli*, Hope, which is described as having rows of tubercles on the elytra, and therefore must be very distinct. The head and prothorax are much less closely punctured than in *trivialis*, Er., the sides of the latter more sinuate behind, the seriate punctures of the elytra somewhat coarser. Mr. Champion has seen this insect, and cannot identify it with any previously described.

S. Australia; Morgan.

C aspersus, sp. nov. Oblongo-ovatus; sat convexus; sat opacus; piceus, setis brevibus suberectis (alteris nigris, alteris pallidis) vestitus, antennis pedibusque plus minusve rufescentibus; capite rugulose sat crebre punctulato; antennis prothoracem haud superantibus; hoc fortiter transverso, crasse rugulose punctulato, antice minus fortiter arcuato-emarginato quam postice angustiori, postice truncato, lateribus sat arcuatis postice vix sinuatis, angulis posticis obtusis fere rectis, latitudine majori mox ante medium posita; elytris punctulato-striatis, interstitiis vix convexis rugulosis. Long., $2\frac{4}{5}$—$3\frac{1}{5}$ l.; lat., $1\frac{1}{5}$—$1\frac{3}{10}$ l.

I do not observe any well marked sexual characters in the examples of this species that have come under my notice. The presence of setæ of two colors vaguely intermingled gives the elytra a speckled appearance. This is the species referred to by Mr. Champion (Tr. Ent. Soc., 1894, p. 356) as closely allied to his *C. brevis*.

S. Australia.

C. angustior, sp. nov. Elongato-ovatus; minus convexus; minus nitidus; piceus vel piceo-niger, setis brevibus obscuris suberectis vestitus, antennis pedibusque plus minusve dilutioribus, capite rugulose sat crebre punctulato; antennis prothoracem superantibus, articulis 9° leviter 10° fortiter transversis; prothorace leviter transverso, ut caput punctulato, antice arcuato-emarginato quam postice multo angustiori, postice in medio late subquadratim lobato, lateribus leviter arcuatis postice manifeste sinuatis, angulis posticis rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis quadratis sat magnis, interstitiis leviter convexis vix rugulosis; maris tibiis anticis versus apicem (ut *C. trivialis*, Er.) dilatatis, tarsis anticis leviter dilatatis. Long., $3\frac{4}{5}$—4 l.; lat., $1\frac{2}{5}$ l.

This species seems nearer to *C. trivialis*, Er., than to any other described species. Compared with it, its color is of a much more brownish (rather than black) tone, its form is narrower, and more parallel, its prothorax is less transverse (to a casual glance appearing quite as long as wide), and more distinctly lobed at the base (the lobe appearing quite squarely truncate behind when viewed with the head of the insect towards the observer), and the antennæ are more slender with their third joint proportionally longer. Mr. Champion has compared this species with the types of those described by Hope and Pascoe and finds it distinct from them.

S. Australia.

C. eremicola, sp. nov. Oblongus; piceo-niger, setis brevissimis aureis retrorsum curvatis sat sparsim vestitus, antennis pedibusque picescentibus, tarsis ferrugineis; capite fortiter subrugulose punctulato; oculis parvis; antennis prothoracem superantibus, apicem versus parum incrassatis; prothorace sat transverso, fortiter sat crebre vix rugulose (fere ut caput) punctulato, antice arcuato-emarginato quam postice multo angustiori, postice in medio late leviter lobato, lateribus rotundatis postice nullo modo sinuatis, angulis posticis rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis sat magnis sat rotundatis, interstitiis subelevatis sublævibus. Long., $5\frac{1}{5}$ l.; lat., $1\frac{4}{5}$ l.

This species, on account of its large size and non-tuberculate elytra, needs distinguishing only from *C. Championi*, to which it is rather closely allied; but it is readily separated from that insect by its more slender antennæ scarcely thickened towards the apex, its smaller eyes, and more transverse prothorax with coarser and much closer puncturation, the sides of which are rather strongly rounded and not at all sinuate behind. The

elytra also are differently sculptured, the striæ containing for the most part rounded and not very closely placed punctures, whereas in *C. Championi* the puncturation of the striæ is caused by fine transverse keels connecting interstice with interstice.

Central Australia; near Oodnadatta.

C. Zietzi, sp. nov. Oblongus; piceo-niger, setis brevissimis aureis retrorsum curvatis sat sparsim vestitus, antennis tarsisque vix dilutioribus; capite crebre subrugulose sat fortiter punctulato; oculis parvis; antennis prothoracem superantibus, apicem versus leviter incrassatis; prothorace sat transverso, crebre sat fortiter nec rugulose (fere ut caput) punctulato, antice arcuato-emarginato quam postice multo angustiori, postice in medio late minus perspicue lobato, lateribus rotundatis postice nullomodo sinuatis, angulis posticis sat acute rectis, latitudine majori ad medium posita; elytris punctulato-striatis, puncturis in striis minoribus crebris quadratis, interstitiis fere planis sublævibus. Long., $5\frac{1}{2}$ l.; lat., 2 l.

Another large species allied to the preceding, from which it differs by its antennæ somewhat more robust, its prothorax and head evidently more finely and closely punctulate, and by the sculpture of its elytra, the punctures of the striæ being similar to those of *C. Championi*, but evidently smaller. In *C. eremicola* the diameter of most of the punctures in the striæ is greater than the width of an interstice between the striæ; in this species much less. This species differs from *C. Championi* in its prothorax shaped like that of *C. eremicola*, in its smaller eyes, the smaller punctures in the elytral striæ, and the much less rugulose elytral interstices.

Central Australia; taken by Mr. Zietz near Lake Callabonna.

C. minor, sp. nov. Oblongus; piceo-niger, setis brevissimis fulvis sparsim vestitus, antennis pedibusque picescentibus, tarsis dilutioribus; capite sat crasse ruguloso, fronte impressa; oculis parvis; antennis prothoracem superantibus, apicem versus modice incrassatis, articulis 9° vix 10° leviter transversis; prothorace sat transverso, ut caput punctulato, antice arcuato-emarginato quam postice parum angustiori, postice fortiter bisinuato sed vix in medio lobato, lateribus parum arcuatis postice vix sinuatis, angulis posticis acutis, latitudine majori paullo ante medium posita; elytris punctulato-striatis, puncturis in striis sat magnis, interstitiis sat planis uniseriatim granulatis. Long., 3 l.; lat., $1\frac{1}{10}$ l.

May be distinguished superficially from its described congeners by its small size and dark antennæ in combination. It is also remarkable for the very slight curve of the sides of its pro-

thorax (scarcely greater than in *C. punctatissimus*, Pasc.) and the very slight narrowing of the front part of that segment, in which again it resembles *punctatissimus*, but it is of very much broader and less fragile-looking form than that species, and its prothorax is very much more strongly transverse and its elytral striæ are very much more coarsely and less closely punctulate. *C. angustior* also has a prothorax with feebly arcuate sides, but it is much less transverse than that of *C. minor*, and is at its widest in the middle. The unique type of this species seems to be a female.

Victoria.

HOPATRUM.

H. Meyricki, sp. nov. Ovale; sat opacum; fuscum, setulis minutis albidis sat crebre vestitum; capite sat lato, crebre subtilius subrugulose punctulato, clypeo a fronte sulco vix manifesto diviso antice profunde triangulariter emarginato, ad latera sat fortiter (fere ut *H. Walkeri*, Champ.) producto; oculis nullo modo divisis; antennis brevibus, prothoracis basin haud attingentibus, articulis 8-10 transversis; prothorace quam longiori plus quam duplo latiori, ut caput punctulato, ad latera explanato (quam *H. Walkeri* paullo minus late), antice profunde emarginato, postice bisinuato, lateribus modice arcuatis postice nullo modo sinuatis, angulis omnibus acutis, latitudine majori ad basin posita; scutello ut prothorax punctulato; elytris quam prothorax parum latioribus, striatis, striis parum distincte punctulatis, interstitiis fere planis crebre subtilissime granulatis, setulis in interstitiis inæqualiter 4-seriatim dispositis; tibiis anticis sat brevibus a basi ad apicem sat fortiter dilatatis, angulo externo apicali acuto; tarsis setis sat crassis subtus sparsim vestitis. Long., $5\frac{3}{5}$ l.; lat., $2\frac{4}{5}$ l.

This is a fairly well marked species. It is distinguished from all its described Australian congeners by its large size, also from the species of the group of *H. diversum*, Champion, by the deeply emarginate front margin of its prothorax, from *H. torridum* and *Walkeri* by the sides of its prothorax not at all sinuous behind the middle.

W. Australia; taken by E. Meyrick, Esq.

H. Carpentariæ, sp. nov. Ovale; sat opacum; nigrum vel piceo-nigrum, setulis obscure brunneis sat crebre vestitum; capite sat lato, crebre ruguloso, clypeo a fronte sulco sat profundo diviso antice profunde triangulariter emarginato, ad latera sat fortiter (fere ut *H. Walkeri*, Champ.) producto; oculis nullo modo divisis; antennis sat brevibus, prothoracis basin vix attingentibus, articulis 8-10 transversis; prothorace

quam longiori fere duplo latiori, crebrius subtiliter granulato, ad latera explanato (quam *H. Walkeri* multo minus late), antice sat fortiter emarginato, postice bisinuato in medio vix emarginato, lateribus leviter arcuatis postice manifeste vel vix sinuatis, angulis omnibus acutis, latitudine majori ad medium posita; scutello granulato; elytris quam prothorax paullo latioribus, striatis, striis punctis confertis subquadratis impressis, interstitiis sat crebre minus perspicue granulatis [alternis (præsertim 3°) sat manifeste convexis, 2° quam cetera multo angustiori], tibiis anticis subgracilibus a basi ad apicem minus fortiter dilatatis, angulo externo apicali acuto; tarsis setis sat crassis subtus sparsim vestitis. Long., 4—4½ l.; lat., 1⅘—2 l.

A somewhat inconspicuous species, apparently always covered with a very dense earthy indumentum completely concealing the characters. Its most reliable character seems to be the exceptional narrowness of the second elytral interstice, which near the apex is scarcely half as wide as the third. Compared with *H. Walkeri*, its prothorax is seen to be much less rounded laterally and to have a much more narrowly explanate border, while the granules of its elytral interstices are much less conspicuous and confused. Its elytral striæ, moreover, are scarcely rightly called "punctulate," but are divided by closely placed fine ridges which connect the interstices *inter se*. The inequality of its elytral interstices distinguishes this insect from *H. torridum* and *H. Meyricki*, and *inter alia* the separation of the clypeus from the hinder part of the head distinguishes it from the species of the *H. diversum* group, while its elongate and slender front tibiæ also distinguish it from *H. torridum*, &c.

Gulf of Carpentaria, Thursday Island, &c.

H. Adelaidæ, sp. nov. Sat late ovale; opacum; piceo-nigrum, pilis brevibus erectis aureo-fulvis dense vestitum; capite sat lato, crasse rugulose punctulato, clypeo a fronte sulco profundo diviso antice profunde rotundatim emarginato ad latera latissime (quam *H. Walkeri* magis late) producto; oculis nullo modo divisis; antennis brevibus prothoracem medium haud multo superantibus, articulis 8-10 transversis; prothorace quam longiori duplo latiori, crebre ruguloso (quam caput minus grosse) et subtiliter granulato, ad latera sat late (quam *H. Walkeri* vix minus late sed minus perspicue) explanato, antice sat fortiter emarginato, postice bisinuato, lateribus sat rotundatis postice nullo modo sinuatis, angulis anticis subacutis posticis rectis vel fere obtusis, latitudine majori paullo ante basin posita; scutello granulato; elytris quam prothorax parum latioribus, striatis (striis, binis internis exceptis, vix impressis et perspicue nec grosse punct-

ulatis), interstitiis (internis subconvexis externis planis) subtiliter crebrius punctulatis et sparsim granulatis; tibiis anticis sat brevibus, a basi ad apicem fortiter dilatatis, angulo externo apicali acuto; tarsis setis minus crassis subtus sparsim vestitis. Long., 4—4½ l.; lat., 2⅕ l.

This is a very distinct species owing to the presence of a short erect golden-fulvous pubescence rather closely clothing the upper surface. It is also well characterised by the strongly rounded sides of its prothorax, which are not in the least sinuous behind, and by the peculiar striation of its elytra, the sutural stria and the next to it on each elytron being well marked, while the rest of the striæ are obliterated and their place supplied by mere rows of punctures. It is probably allied to *H. villigerum*, Blanch. (from N.W. Australia), which I have not seen; but I do not think it is likely to be identical with *villigerum* as the pubescence of that insect is described as "sparse" and "of a grey color," and the elytra as having "well-marked impunctate striæ." The extreme remoteness *inter se* of the localities where the two species have been taken also points to specific distinctness. It is possible that this is the *Hopatrum* taken by Mr. Walker at Port Adelaide, which Mr. Champion (Tr. Ent. Soc., 1894, p. 359) thinks is perhaps *H. villigerum*.

S. Australia; near Adelaide; also on Yorke's Peninsula.

H. cowardense, sp. nov. Sat late ovale; subnitidum; nigrum, setulis pallidis minutis minus crebre vestitum; capite modice lato, antice longitudinaliter sat crasse ruguloso, postice subtiliter granulato, clypeo antice fortiter arcuatim emarginato, ad latera minus fortiter (oculos parum excedenti) producto, oculis nullo modo divisis; antennis prothoracis basin vix attingentibus, articulis 8-10 transversis; prothorace quam longiori plus quam duplo latiori, vix manifeste punctulato, obsoletissime (in lateribus magis distincte) granulato, antice profunde arcuatim emarginato, postice bisinuato, angulis anticis acutis posticis acute rectis retrorsum vix directis, latitudine majori mox ante basin posita; scutello manifeste punctulato; elytris sublævibus, punctis seriatis vix manifeste impressis, interstitiis planatis subcoriaceis subtilissime granulatis; corpore subtus pedibusque manifeste sat crebre squamose nec fortiter punctulatis; tibiis anticis ad angulos acutos externos sat fortiter a basi dilatatis; tarsis anticis subtus pilis sat elongatis sericeis vestitis. Long., 5 l.; lat., 2½ l.

This remarkable species has not a little of the facies of *Pterohelæus*, but the fact of its tarsi being clothed with long hairs beneath (as in *H. dispersum*, Champ.), and of its clypeus being deeply excised after the *Hopatrid* fashion, shows that it

cannot be really a *Helœid.* On the whole, I see no reason to separate it from *Hopatrum.* When alive it is covered, as usual in *Hopatrum*, with a coating of earthy matter. At once distinguished by its non-striate elytra from all its described Australian congeners.

Coward Springs, near Lake Eyre.

Since writing this description I have examined three specimens of *Hopatrum* taken by Mr. Zietz at Lake Callabonna, which appear to me to be referable to this species, although at the first glance they might be considered to represent three species all distinct from *H. cowardense.* The sculpture of the upper surface seems variable to the utmost extent, but without any other marked differences. The sight of these has led me to remove the earthy incrustation from all the specimens that I took at Coward Springs, and which were all under one stone almost in the water of the spring. I had previously cleaned a couple of them, and had assumed the others to be similar. I find, however, that among the original batch there is no little variation. The type from which the diagnosis was drawn up has the prothorax very obsoletely granulate and the elytra almost lævigate; but two specimens taken in company with it have the prothorax more evidently granulate and the elytra closely and very finely punctulate, and the elytra of one of these latter are traversed by very fine scratch-like longitudinal lines (not true striæ) and are slightly granulate. The three examples from Lake Callabonna are a little longer and narrower in form, and, therefore, might possibly represent a distinct species; but one of them is less so than the other two. The sculpture of one of the Lake Callabonna specimens (one of the more elongate two) is quite identical with that of the last described example from Coward Springs. The second example from Lake Callabonna has the elytra more decidedly granulate, with several rows of rather large very faintly impressed punctures (scarcely discernible traces of which exist in the original type), the intervals between which are not quite flat; while the third Lake Callabonna specimen has the prothorax still more decidedly, almost strongly, granulate, while its elytra bear almost regular rows of well-defined punctures, the third fifth and seventh intervals between these rows being roundly and quite strongly elevated. The original type and the last mentioned Lake Callabonna specimen could certainly not be treated as specifically identical without the knowledge of the intermediate forms.

H. darlingense, sp. nov. Ovale; subnitidum; nigrum, setulis pallidis minutis minus crebre vestitum, antennis pedibusque plus minusve picescentibus; capite minus lato fortiter minus crebre punctulato, clypeo cum capite confuso antice profunde emarginato, ad latera minus fortiter (oculos parum

excedenti) producto, oculis haud (sed fere) divisis ; antennis prothoracis basin attingentibus, articulis 9-10 vix transversis ; prothorace quam longiori minus quam duplo latiori, fortius sat crebre nec rugulose punctulato, antice minus profunde emarginato, postice bisinuato, lateribus modice arcuatis, angulis anticis minus acutis posticis subrectis sat explanatis, latitudine majori mox ante basin posita ; scutello ut prothorax punctulato ; elytris quam prothorax sat latioribus, vix striatis, striis puncturis sat fortibus impressis, interstitiis sat planis subtiliter nec crebre punctulatis ; tibiis anticis sat gracilibus apicem versus modice dilatatis ; tarsis subtus pilis sat elongatis sericeis vestitis. Long., 4 l. ; lat., $1\frac{3}{5}$ l.

This species belongs to the same section of *Hopatrum* as *dispersum*, Champion, and *vagabundum*, Champion, and of which *H. longicorne*, Blackb., is also a member ; it is distinguished by the long silky hairs that clothe the tarsi, the somewhat exserted head with its clypeus not separated by a furrow, the comparatively narrow orbits of the eyes, the feebly emarginate front of the prothorax, the feebly (or not at all) rugulose character of the sculpture, and the almost (or quite) divided eyes. Mr. Champion describes the eyes of his species as "divided," but in the example of *H. dispersum*, which he has been good enough to send me, the two portions of the eye appear to me to be very narrowly in contact with each other at their hinder extremity as they are in the present species.

The present insect differs from *H. dispersum* by the very feeble but comparatively strongly punctured striæ of its elytra, from *H. vagabundum* by its non-granulose elytral interstices, and from *H. longicorne* (to which it is rather close) by the less crowded puncturation of the head and prothorax and by the considerably stronger punctures in the quasi-striæ of the elytra.

N.S. Wales ; Darling River District.

H. longicorne, Blackb. In my description of this species (Trans. Roy. Soc. S.A., XVI., p. 40) I have introduced an accidental error, having written "capite cum prothorace *elytrisque* sat fortiter sat crebre nec rugulose punctulato." The word "elytrisque" should be excised.

H. Darwini, sp. nov. Ovale, sat breve ; subnitidum ; nigrum, setulis aureo-fulvis brevibus suberectis minus crebre vestitum, antennis tarsisque rufescentibus ; capite minus lato fortiter crebre punctulato, clypeo cum capite confuso antice profunde emarginato, ad latera minus fortiter (oculos parum excedenti) producto, oculis haud (sed fere) divisis ; antennis prothoracis basin vix attingentibus, articulis 8-10 vix con

vexis; prothorace quam longiori duplo latiori crebre sat fortiter punctulato, antice minus profunde emarginato, postice bisinuato, lateribus sat arcuatis postice vix sinuatis, angulis anticis sat obtusis posticis sat acutis, latitudine majori vix pone medium posita; elytris quam prothorax parum latioribus, punctulato-striatis, puncturis in striis sat magnis sat quadratis, interstitiis subconvexis sparsim punctulatis; tibiis anticis gracilibus, apicem versus leviter dilatatis; tarsis subtus pilis sat elongatis sericeis vestitis. Long., 3 l.; lat. $1\frac{2}{5}$ l.

This also is of the same section as the preceding. It is rather close to *dispersum* and *vagabundum*, differing from the former *inter alia* by the squarish somewhat large punctures in its elytral striæ and the shorter vestiture of its upper surface, and from the latter (as described; I have not seen a type) by the interstices of its elytral striæ not being granuliferous. From *H. longicorne* and *darlingense* it differs *inter alia* by the much stronger striation of its elytra.

N. Territory of S. Australia; near Port Darwin.

H. Victoriæ, sp. nov. Ovale; minus opacum; nigrum, setulis griseis sat crebre vestitum; capite sat lato crebre ruguloso, clypeo a fronte sulco sat profundo diviso antice rotundatim minus profunde emarginato, ad latera sat fortiter (fere ut *H. Walkeri*, Champ.) producto; oculis nullo modo divisis; antennis brevibus prothoracem medium haud multo superantibus, articulis 8-10 transversis; prothorace quam longiori plus quam duplo latiori, subtiliter subcrebre indistincte granulato, ad latera explanato (quam *H. Walkeri* vix minus late), antice fortiter emarginato, postice bisinuato, lateribus leviter arcuatis postice nullo modo sinuatis, angulis omnibus leviter acutis, latitudine majori fere ad basin posita; scutello ut prothorax granulato; elytris leviter striatis, striis per rugulas crebras subtiles quasi punctulatis, interstitiis planis crebre subtiliter punctulatis obsolete granulatis; tibiis anticis modicis a basi ad apicem dilatatis, angulo externo apicali acuto; tarsis setis sat crassis subtus sparsim vestitis. Long., 5 l.; lat., $2\frac{1}{2}$ l.

This species perhaps may be best compared with *H. torridum*, Champion, from which its larger size, much more widely explanate prothoracic border, wider and more absolutely flat elytral interstices, and generally finer and less rugulose puncturation render it very distinct. I have seen only a single example, which is in my own collection. It also resembles *Meyricki*, Blackb., differing from it, however, *inter alia* by the feeble rounded emargination of the front of its clypeus.

Victoria.

ULOMA.

U. depressa, Pasc. This name seems to have been provided for the same insect as *U. consentanea*, Perroud. The latter is the older name. I may remark that *Achthosus*, Pasc., does not seem to differ from *Uloma* in any way likely to be really generic, although Pascoe in characterising the former does not make any reference to the latter.

ADELIUM.

A. ellipticum, sp. nov. Elongato-ovale, postice acuminatum; æneum, antennis tarsisque rufescentibus; capite subtiliter, prothorace subtilissime, sparsim punctulatis; hoc antice angustatum, lateribus pone medium rotundatim dilatatis; elytris subtiliter punctulato-striatis, interstitiis sat planis vix manifeste punctulatis. Long., 7—7½ l.; lat.,2½—3 l.

A remarkably distinct species. Mr. Champion informs me that it is in the collection of Mr. F. Bates under the name I have called it by, but I cannot find that any description has been published.

N.S. Wales; Clarence River district.

LICINOMA.

L. sylvicola, sp. nov. Nigra; nitida; capite sparsim subtiliter punctulato, antice transversim late profunde sulcato; antennarum articulo apicali quam 10us paullo longiori; prothorace leviter transverso, postice leviter angustato, sparsim leviter punctulato, lateribus leviter arcuatis, disco foveis nonnullis impresso; elytris sat fortiter punctulato-striatis, interstitiis sat planis lævibus. Long., 4—4½ l.; lat., 1½—1⅗ l.

Mr. Champion has done me the favor of comparing this species with the two described by Mr. Pascoe and tells me it is distinct from them. It is obviously very different from *L. violacea*, Macl., of which the elytra are said to be "of a violet hue" and the head is described as "roughly punctate, subrugose." Unfortunately, Mr. Pascoe's descriptions are not of a kind to facilitate the indication of distinctive characters, and in this case I must limit myself to saying that *L. nitida*, Pasc., as compared with the present insect, appears to be differently colored and to have finer elytral striation, while *L. elata*, Pasc., is a larger and also differently colored species.

N.S. Wales; Forest Reefs; taken by Mr. Lea.

ANTHICIDÆ.

SYZETON.

S. lætus, Blackb. This species is identical with *S.* (*Anthicus*) *abnormis*, King. It cannot be rightly referred to *Anthicus*—

indeed (as I have previously remarked), it is doubtful whether *Anthicus* and *Syzeton* can rightly be associated in one *family*. King's is the older name.

CURCULIONIDÆ.

CYLAS.

C. formicarius, Fab. According to M. Faust (Ann. Soc. Ent. Fr., 1893, p. 513) *C. turcipennis* (Bohem.), Sch., is not distinct from this species, and therefore *turcipennis* ought to be regarded as a synonym. In April of this present year I recorded the occurrence in Australia of *C. turcipennis*.

PHYTOPHAGA.

PAROPSIS.

This genus contains more described Australian species than any other except *Stigmodera*. Mr. Masters' catalogue—1887—enumerates 271 species, and 15 have been added since. The only attempt, so far as I know, at a comprehensive treatment of the species is found in the Ann. Soc. Ent., Belg., 1877, where Dr. Chapuis, in describing a large number of new species, takes the opportunity to subdivide the genus into four groups, and enumerates the species known to him belonging to each group, but omits those of previous authors which he had not identified. Dr. Chapuis' groups are founded on the sculpture of the elytra, as follows:—Group I. Elytral punctures without any seriate longitudinal disposition—27 species. Group II. Differs from I. by the presence of longitudinal smooth spaces among the punctures of the elytra—19 species. Group III. Each elytron bears ten longitudinal rows of punctures—118 species. Group IV. Each elytron bears 20 longitudinal rows of punctures—63 species. This method of subdividing *Paropsis* appears to me the best available—at any rate I cannot find a better. In the Journal of Entomology for December, 1864, Mr. J. S. Baly had commenced a systematic work on *Paropsis*, of which, however, only a single part—dealing with 20 species—appeared. Mr. Baly proposed to divide the genus into only two sections—apparently his first section equalled Dr. Chapius' first and second combined, and his second Dr. Chapuis' third and fourth combined. I have lately had the good fortune to obtain a large number of species of *Paropsis* from Dr. Chapuis' collection ticketed with his names, and with this assistance have been enabled to ascertain the names of the greater part of the species in my collection and in some other collections to which I have had access; and I think I am in a position to furnish a revision of the genus, which, though doubtless needing correction, may yet serve as a useful basis for

future work. In this present memoir I offer to the Royal Society a revision of the species hitherto described, together with descriptions of 18 new species, belonging to Dr. Chapuis' Group I., and hope in the future to be able to offer revisions of the three other groups.

A few preliminary remarks seem to be called for as to the history of the genus. It was founded in 1807 by Olivier, and again under a different name—*Notoclea*—in the following year by Marsham, each of those authors describing a considerable number of species. Previously to either of these authors, however, several species had been described by Fabricius under the name *Chrysomela*, together with numerous other species, for most of which modern classification has found it necessary to provide other generic names. In subsequent years species of *Paropsis* were described by W. S. Macleay (1827), Boisduval (1835), White (1841), Newman and Erichson (1842), Gory (1845), Germar (1848), Bohemann (1858), Stäl and Motschulsky (1860), Fauvel (1862), Baly (1864), Clark (1865), Chapuis (1877), and Blackburn (1890, 91, and 92).

Turning now to the consideration of the species of *Paropsis* referable to Dr. Chapuis' Group I., I think that the catalogue as given by its author may be regarded as containing all the previously described species that there is good reason for attributing to the group except *Parryi*, Baly, and *Lownei*, Baly; although it is possible that some of the insufficiently described species—especially some of Boisduval—may sooner or later be found by inspection of types to require adding to them. The catalogue, however, contains names of two species that do not seem entitled to appear there, viz., *crocata*, Boisd., and *atomaria*, Marsh. The former of these is not intelligibly described, and in my opinion Dr. Chapuis should have omitted it altogether, as he has done most of Boisduval's names, unless he could give the assurance that he had inspected the type, which it seems almost certain he had not done. I have a specimen from Dr. Chapuis' collection ticketed "*crocata*, Adelaide," which is unquestionably identical with *Waterhousei*, Baly. Among the large number of specimens of the genus that I have examined I have not seen this species from any locality outside S. Australia, while Boisduval's *crocata* is presumably from N.S. Wales. There seems no reason, therefore, to drop Baly's name of the S. Australian insect in favor of a name founded on a species from a distant locality to which no intelligible description is attached, and I accordingly omit *crocata* altogether. As regards *atomaria*, Marsh., it is a *nom. præocc.*, *Paropsis atomaria*, Ol., being a very different insect; and it is remarkable that this escaped Chapuis' notice. Chapuis gives *charybdis*, Stäl., as a synonym of *atomaria*, Marsh.; and Baly

thinks that *dilatata*, Er., is probably another synonym of it, he also overlooking the existence of *P. atomaria*, Oliv. Under these circumstances it seems perhaps best to take provisionally the oldest of the names that have been regarded as synonymous and to call the insect *dilatata*, Er., until some reason be produced to the contrary. At all events *atomaria*, Marsh., cannot stand.

Thus corrected, Dr. Chapuis' Catalogue of Group I. contains the names of 27 species, and of these I have more or less reliable types of 25—some few of them identified by description, and most of them represented by types from Chapuis. The two that I do not know are *nigroscutata*, Chp., and *formosa*, Chp.; the former of these is insufficiently described and may possibly be my *montana* or *debilitata*; *formosa* I feel confident that I have not seen.

Dr. Baly's descriptions of the 11 species of this group that bear his names and his re-descriptions of the eight other species dealt with in his paper referred to above are in most respects very satisfactory, but two remarks regarding them seem called for—the one, that they include as main characters the form of internal sexual organs, which, requiring dissection for examination, are obviously not easily available to the student (I have omitted all reference to these organs in my descriptions, from want of material for dissection); the other, that Baly's statements of the comparative length, breadth, &c., of prothorax, elytra, &c. are very unreliable, being evidently not founded on measurement; thus that author makes the prothorax of many species three times (or even more) as broad as long, whereas I have not seen any *Paropsis* (at any rate of Group I.) whose prothorax by measurement is even very nearly three times as broad as long, though to a casual glance some appear so; and again, the proportion of the length of the elytra to their breadth is always over-stated by Baly, those organs appearing to the eye considerably longer as compared with their width than actual measurement shows them to be. One of the species *(P. suspiciosa)* dealt with by Baly is not a member of Chapuis' Group I.

Although the species of *Paropsis* forming this group are for the most part very satisfactorily distinct *inter se*, and unlikely to be reduced in number by subsequent investigation, their distinctive characters are by no means easy to specify sufficiently clearly in words for confident identification—often consisting in differences of form or of sculpture that it is difficult to express definitely. Consequently I have found it necessary to adopt a system of indicating the measurements with exactness, as I find these very constant in either sex of each species. It will be necessary then to explain—first, that by the "height" of a species I mean the distance (the insect being so regarded that the suture

of the elytra is in its upper outline and the lateral margin is in its lower outline and the humeral angle seems directed downward) from the highest point of the upper outline to the lower outline, *i.e.*, the length of that portion of a pin passing from one to the other of these points, which would be in the body of the insect; second, that the length and breadth of the elytra is ascertained on the undersurface, the length being the length of a line from the apex of the elytra to the point where a transverse line from shoulder to shoulder intersects the longitudinal middle line of the insect (usually on the prosternum), the *breadth* being the greatest distance between the lateral edges of the elytra; in measuring the breadth allowance must be made for any displacement there may be of the elytra. It is impossible to measure either length or breadth of elytra reliably on the upper surface owing to the great convexity of those organs.

After long and careful consideration, I have been unable to make use of the external sexual organs as specific characters. They are exceedingly well marked inter-sexually, consisting in the shape of the tarsal joints, the length of the antennæ and the form of the apical ventral segment, and in some species in the outline of the body—but they do not vary much specifically. While this undoubtedly increases the difficulty of distinguishing species, it removes the objection to describing species on the characters of one sex alone, as it is easy to judge with tolerable certainty what would be the characters of the other sex. This remark has reference merely to Group I. of the genus; in at least one of the other groups there are species in which sexual characters seem more important.

In the following table will be found the distinctive characters, then, of 46 species, which is the total number known to me today as attributable to Dr. Chapuis' first group of *Paropsis;* viz., 25 enumerated in Dr. Chapuis' Catalogue, three since described by myself, and 18, of which the descriptions are furnished below.

Tabulation of those of the described species of *Paropsis* whose elytral puncturation is entirely confused ("Group I." of Chapuis):—

A. Front angles of prothorax mucronate.
  B. Sides of prothorax not (or scarcely) bisinuate.
    C. Scutellum deep black.
      D. Prothorax more than twice as wide as long ... ... *Parryi*, Baly.
      DD. Prothorax not more than twice as wide as long.
        E. Disc of elytra with raised wart-like inæqualities ... . *Lownei*, Baly.
        EE. Disc of elytra devoid of wart-like inæqualities.
          F. Puncturation of elytra moderately close (as in *P. Lownei*) ... ... *montana*, Blackb.

FF. Puncturation of elytra much more close ... ... *debilitata*, Blackb.
CC. Scutellum pallid or a little infuscate.
D. Elytra moderately and not very closely verrucose.
E. Large species (long. 5 l. or more) with front angles of prothorax strongly mucronate.
F. Elytral puncturation well defined over the whole surface.
G. Underside deep black ... ... *tasmanica*, Baly.
GG. Underside pallid or more or less infuscate.
H. Antennæ very long (two-thirds or more of whole body), with third joint much longer than first ... ... *longicornis*, Blackb.
HH. Antennæ normal.
I. Elytral puncturation moderately close.
J. Humeral angles normal.
K. Elytra scarcely wider than long ... ... *variolosa*, Marsh.
KK. Elytra considerably wider than long ... ... *affinis*, Blackb.
JJ. Humeral angles exceptionally strongly produced (elytra longer than wide) *angusticollis*, Blackb.
II. Elytral puncturation more sparse.
J. Elytra wider than long.
K. Elytral puncturation almost wanting near middle of suture ... ... *aciculata*, Chp.
KK. Elytral puncturation less obsolete near middle of suture ... ... *Wilsoni*, Baly.
JJ. Elytra wider than long ... *advena*, Blackb.
FF. Elytral puncturation on disc buried in rugulosity ... ... *cerea*, Blackb.
EE. Small species (less than long. 4½ l.); front angles feebly mucronate.
F. Prothorax sparsely punctulate.
G. Elytra normally convex.
H. Very nitid ... ... *ornata*, Marsh.
HH. Much less nitid ... ... *Bovilli*, Blackb.
GG. Elytra gibbous behind scutellum (as in *consimilis*, Baly) ... *rufitarsis*, Chp.
FF. Prothorax on disc closely and evenly punctulate ... . *Paphia*, Stäl.
DD. Elytra (at least towards apex) very strongly and very closely verrucose.
E. Elytra normally convex.
F. Greatest height of the insect is in front of middle of elytra.
G. Elytra not wider than long ... *reticulata*, Marsh.
GG. Elytra wider than long ... *insularis*, Blackb.
FF. Greatest height of the insect is behind the middle of the elytra ... *dilatata*, Er.

EE. Elytra gibbous (as in *P. consimilis*, &c.) *gibbosa*, Blackb.
DDD. Interstices of the elytral punctures quite flat ... ... *pictipes*, Chp.
BB. Sides of prothorax strongly bisinuate.
C. Prosternum longitudinally concave.
D. Elytra with raised colored blotches forming a defined pattern.
E. The blotches on elytra comparatively small.
F. The blotches not consisting of conspicuous vittæ.
G. Elytra evenly convex.
H. Underside black ... ... *lutea*, Marsh.
HH. Underside pallid.
I. Prosternum very wide, bisulcate ... ... *geographica*, Baly.
II. Prosternum narrower, simply sulcate ... ... *marmorea*, Oliv.
GG. Elytra gibbous (as in *P. gibbosa*, &c.).
H. One of the conspicuous elevated pale elytral spots is a common one a little in front of middle of suture .. .. *colorata*, Blackb.
HH. None of the conspicuous pale spots is placed on the suture *consimilis*, Baly.
FF. The blotches consist of conspicuous vittæ ... ... *propinqua*, Baly.
EE. At least one of the elytral blotches large, with diameter equal to one-quarter the width of an elytron ... *maculata*, Marsh.
DD. Elytra not ornamented with a pattern formed by raised colored blotches.
E. The wart-like inequalities of the elytra not running in longitudinal series.
F. Underside more or less pallid.
G. Elytra moderately or feebly verrucose.
H. Elytra not or only moderately ovate in form.
I. Elytra without any trace of transverse dark markings.
J. Puncturation of elytra moderately close (more close than in *P. obsoleta*, Oliv.).
K. The color of the elytral punctures black, in strong contrast to the pale yellowish derm ... *roseola*, Baly.
KK. The elytral punctures concolorous, or nearly so, with the derm.
L. Prothorax considerably more than twice as wide as long (color pale greenish or greenish yellow) ... *glauca*, Blackb.

LL. Prothorax very little more than twice as wide as long (color dark brown) ... *yilgarnensis*, Blackb.
JJ. Puncturation of elytra very sparse (more so than in *P. obsoleta*) ... ... *Zietzi*, Blackb.
II. Elytra with distinctly traceable transverse fasciæ, or rows of blotches placed transversely.
J. Size comparatively small (long., 5 l., or less).
K. Sides of prothorax exceptionally feebly bisinuate *obsoleta*, Oliv.
KK. Sides of prothorax normal (*i.e.*, rather strongly bi-emarginate) ... ... *variegata*, Blackb.
JJ. Size much larger (long., about 6 l.) ... ... *mystica*, Blackb.
HH. Elytra very strongly dilated hindward in both sexes ... *mutabilis*, Blackb.
GG. Elytra very strongly verrucose, especially near apex.
H. Elytra normally convex.
I. Punctures of the elytra moderate (much as in *P. porosa*, Er., &c.) ... ... *carnosa*, Baly.
II. Punctures of the elytra very large ... ... *latissima*, Blackb.
HH. Elytra sub-gibbous behind scutellum (as in *P. consimilis*, &c.) ... ... *convexa*, Blackb.
FF. Underside black ... ... *bella*, Blackb.
EE. The wart-like inæqualities of the elytra forming longitudinal series... *intermedia*, Blackb.
CC. Prosternum convex in its front half ... *porosa*, Er.
AA. Front angles of prothorax not mucronate.
B. Lateral margin of elytra normal.
C. Elytral derm unicolorous fusco-testaceous (length, about 4½ l.) ... ... *irrorata*, Chp.
CC. Elytral derm variegated with fulvous and black (length, about 5½ l.) ... ... *fulvo-guttata*, Baly.
BB. Elytra with a conspicuous thickened margin (as in *P. longicornis*) ... ... *Waterhousei*, Baly.

P. montana, sp. nov. Late ovalis (mare subrotundato); convexa; sat nitida; subtus atra; supra (scutello atro excepto) testacea plus minusve rufescens, pedibus atris, femoribus tibiisque flavo-variegatis, antennis apicem versus nigris; capite sat fortiter inæqualiter punctulato, linea longitudinali impresso; antennis quam corporis dimidium (maris sat, feminæ parum) longioribus, articulo 3° quam 1us vix longiori; prothorace quam longiori vix plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco sat

fortiter sat crebre vix acervatim (ad latera crasse) punctulato, interstitiis subtilissime sparsissime punctulatis, lateribus leviter arcuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus haud longioribus (maris brevioribus), minus crebre (fere ut *P. Wilsoni*) punctulatis, interstitiis sparsim punctulatis vix (latera apicemque versus paullo magis distincte) elevatis, angulis humeralibus (a latere visis) rotundatis deorsum sat productis; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., mas., $6\frac{1}{5}$ l.; lat., $5\frac{1}{10}$ l. Fem., long., 7 l.; lat., $5\frac{1}{5}$ l.

This species comes near *P. Parryi*, Baly, and *P. Lownei*, Baly. From the former it differs by its shorter form, elytral interstices even less raised, less transverse prothorax, rufous elytra, &c.; from the latter by its elytra being devoid of distinct wart-like inæqualities, its head and prothorax entirely devoid of black markings, &c.

N.S. Wales; Blue Mountains.

P. debilitata, sp. nov. Fem. Sat late ovalis; convexa; sat nitida; subtus atra (sternis plus minusve flavis exceptis); supra (scutello atro excepto) sordide flava, pedibus (exempli descripti) flavis (genubus tibiarum basi et apice tarsisque nigris exceptis), antennis (parte basali excepta) nigris; capite sat fortiter inæqualiter punctulato, linea longitudinali antice impresso; antennis quam corporis dimidium parum longioribus, articulo 3° quam 1us haud longiori; prothorace quam longiori duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco sat fortiter sat crebre vix acervatim (ad latera crasse) punctulato, interstitiis vix manifeste punctulatis, lateribus leviter arcuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus vix longioribus, sat crebre subtilius (quam *P. variolosi*, Marsh., paullo magis crebre magis subtiliter) punctulatis, interstitiis sparsim punctulatis vix elevatis, angulis humeralibus (a latere visis) rotundatis vix deorsum productis; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., 7 l.; lat., 5 l.

Another ally of *P. Parryi* and *Lownei*, differing from the latter by its elytra devoid of raised inequalities, though the interstices are not quite flat as they are in *P. Waterhousei*, Baly; and from the former (which it resembles in the general color of the upper surface) by the much finer and closer puncturation of its elytra. It is closely allied to *P. montana*, but differs in its color and in the much closer puncturation of its elytra which is not much less close and fine than in *P. Waterhousei*.

Australia; I do not know the exact locality.

P. longicornis, sp. nov. Lata; modice (mari quam femina minus) convexa; minus nitida; testacea plus minusve rufo-tincta, antennis apicem versus mandibulorum apicibus et corporis supra puncturis plurimis nigricantibus; antennis quam corpus totum tertia (vel minore) parte brevioribus, articulo 3° quam 1us multo longiori; capite prothoraceque acervatim sat fortiter (hoc ad latera crasse) punctulatis, interstitiis sat lævibus; prothorace quam longiori paullo plus quam duplo latiori (sc. ut 8 ad $3\frac{1}{2}$), antice fortiter sinuatim emarginato, postice arcuato, lateribus sat arcuatis, angulis anticis mucronatis sed minus acutis posticis fere nullis; elytris margine laterali insigni crasso instructis, confuse sat æqualiter nec crebre punctulatis, puncturis (his in parte ultra-discoidali exceptis) nigris, interstitiis basin versus vix manifeste apicem versus gradatim magis fortiter elevatis, interstitiis alteris lævibus alteris puncturas singulas ferentibus, angulis humeralibus (a latere visis) vix deorsum directis, margine pone humerum laterali vix concavo; prosterno sat angusto, longitudinaliter sulcato. Long., $6\frac{1}{2}$—7 l.; lat., 5—$5\frac{1}{10}$ l.

The general color is testaceous with a beautiful pink tone overspreading most of the surface. The punctures on the prothorax are mostly concolorous with the surface, but some are black—usually in clusters; the elytral punctures are all black, except those on the dilated margin. Among the species (of Chapuis' first group of *Paropsis*, to which this insect belongs) having the upper and under surfaces and legs pallid, this species may be at once known by the well-defined thickened lateral edging of its elytra (which is much stronger than in any other *Paropsis* known to me except *P. Waterhousei*) and its long antennæ, which by measurement are fully two-thirds of the length of the whole body in the female and a little longer still in the male. Its nearest ally, however, is the species that I take to be *P. Parryi*, Baly. From *P. Parryi* it departs (according to the description of that species) by its very different coloring in almost every part (*Parryi* having underside scutellum and most of legs and antennæ black, and elytral punctures not black); and also differs from the species that I take to be *Parryi* by its much shorter form, greater closeness of the elytral verrucæ near the apex, less rounded-off apex of the humeral angle, &c.

Victoria; on *Eucalypti*; on the higher mountains of the Alpine Range.

P. cerea, sp. nov. Mas. Sat late ovalis; fortiter convexa; minus nitida; tota (mandibulorum apice nigro excepto) obscure flava (ut cerea), elytris mox intra marginem dilatatam vix perspicue longitudinaliter infuscatis; antennis quam corporis dimidium vix longioribus, articulo 3° quam 1us parum

longiori ; capite prothoraceque acervatim minus fortiter (hoc ad latera sat crasse) punctulatis, interstitiis puncturarum (in capite sat perspicue in prothorace vix manifeste) subtiliter punctulatis ; prothorace quam longiori paullo plus quam duplo (ut $8\frac{1}{2}$ ad 4) latiori, antice fortiter sinuatim emarginato, postice bisinuato, lateribus sat arcuatis, angulis anticis mucronatis sat acutis posticis fere nullis ; elytris suturam versus sparsim subtilius punctulatis, aliunde crasse confuse rugatis (vix perspicue punctulatis), interstitiis inæqualiter verruciformibus sublævibus, angulis humeralibus (a latere visis) manifeste deorsum directis, margine pone humerum laterali sat concavo ; prosterno sat lato longitudinaliter sulcato. Long., 6 l. ; lat., $4\frac{4}{5}$ l.

The whole insect, except the apex of the mandibles, is of a dull flavous color and looks as if it were made of wax. The sculpture of the elytra, except close to the suture, appears to consist of a system of closely-placed deep sinuous wrinkles, among which the interstices are more or less elevated or verrucose ; towards the front part of the dilated margin there are some coarse punctures distinctly visible.

Queensland.

P. affinis, sp. nov. Fem. Subrotundata ; valde convexa ; sat nitida ; testaceo-brunnea, antennis extrorsum atris, mandibulorum apice elytrorum puncturis et sternorum partibus nonnullis infuscatis ; capite modice punctulato, pone clypeum æquali ; antennis modicis, articulo 3° quam 1us vix longiori ; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat fortiter vix sparsim (ad latera crassissime) punctulato, interstitiis vix manifeste punctulatis, lateribus modice arcuatis, angulis anticis mucronatis posticis fere nullis ; elytris quam longioribus paullo latioribus, fere ut *P. variolosi*, Marsh., sculpturatis (*i.e.*, modice crebre fusco-punctulatis et verrucis sat numerosis obsolete elevatis ornatis), angulis humeralibus (a latere visis) rotundatis deorsum parum productis ; prosterno modico longitudinaliter sulcato. Long., $6\frac{1}{2}$ l. ; lat., $4\frac{4}{5}$ l.

This species, perhaps, is nearest to *P. variolosa*, Marsh., from which it differs by its shorter form and greater convexity (the height of the insect being to the length of the elytra as 7 to 12 ; in *variolosa* it is as 7 to 13), its antennæ deep black outside the fifth joint, its head not longitudinally impressed, &c. I have seen only a single specimen of this insect, which is in my own collection.

N.S. Wales ; Clarence River District.

P. advena, sp. nov. Fem. Ovalis; convexa; sat nitida; obscure flava, mandibulorum apice labro clypeo antice et elytrorum vittis nonnullis nigricantibus; antennis extrorsum paullo infuscatis; capite modice punctulato, linea subtili longitudinali leviter impresso; antennis quam corporis dimidium brevioribus, articulo 3° quam 1us haud longiori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat fortiter subcrebre (ad latera crassissime) punctulato, interstitiis obsolete subtilissime punctulatis, lateribus sat arcuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus paullo longioribus, minus crebre (fere ut *P. Wilsoni*, Baly) sat fortiter punctulatis, puncturis in vittis latis nigricantibus, interstitiis leviter inæqualiter elevatis, angulis humeralibus (a latere visis) rotundatis deorsum parum pro ductis; prosterno modice lato longitudinaliter sulcato, sulc fundo postice carinato. Long., 6½ l.; lat., 4⅘ l

The comparatively elongate form of this insect, with elytra by measurement distinctly (by about $\frac{1}{12}$ of their width) longer than together wide, together with the comparatively sparse punctuation of its elytra, will distinguish it from its allies. The markings on the elytra of my unique example are very distinctive, but it is doubtful whether they are constant; they consist of a number of wide dark vittæ (on which the punctures are nearly black) and may be thus described: from a point on the suture slightly in front of the apex five vittæ diverge forwards (*i.e.*, towards the front of the elytra)—one up the suture, one close to the lateral margin, and three at equal intervals between; the sutural vitta is continuous to near the scutellum, a little behind which it ceases; the others extend to the base, but the second (counting from the suture) is widely interrupted in the middle; the external three all become very faint about the middle and then becoming well defined again coalesce in a large blotch on and around the humeral callus. The width of these vittæ is such that they are wider than the intervals between them; the first, third, and fourth are the widest.

Australia; exact habitat unknown, but it is probably in S.W. Australia.

P. angusticollis, sp. nov. Fem. Ovalis; convexa; minus nitida; testacea, antennis versus apicem mandibulisque nigricantibus; antennis quam corporis dimidium brevioribus, articulo 3° quam 1us haud longiori; capite sparsim punctulato; prothorace quam longiori vix duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato et in medio lobato (lobo postice subtruncato), in disco sparsissime sat subtiliter latera versus magis crasse paullo magis crebre punctulato,

interstitiis sparsim subtilissime punctulatis, lateribus sub sinuatim arcuatis, angulis anticis mucronatis posticis fere nullis; elytris (parte antica suturali excepta) subobsolete verrucosis, minus crebre (fere ut *P. Wilsoni*, Baly, sed magis subtiliter) punctulatis, interstitiis sparsim subtilissime punctulatis, angulis humeralibus (a latere visis) rotundatis deorsum sat fortiter (magis quam ♀*P. variolosi*, Marsh.) directis; prosterno lato sulcato, sulci fundo sat fortiter carinato. Long., $7\frac{3}{4}$ l.; lat., 5 l.

In the example on which this description is founded the elytral punctures are only slightly infuscate; in a second specimen they are almost black. The most conspicuous character of this fine large species seems to lie in the narrowness of its prothorax; a second character consists in the evident though slight sinuosity of the lateral margin of its prothorax.

Australia; exact habitat uncertain, probably N.S. Wales.

P. Bovilli, sp. nov. Fem. Late ovata; sat convexa; sat nitida; testaceo-brunnea (mandibulorum apice et in elytris verrucarum interstitiis nigricantibus labroque albido exceptis); antennis quam corporis dimidium vix longioribus, articulo 3° quam 1us haud longiori; capite prothoraceque acervatim modice fortiter hoc ad latera sat crasse punctulatis, interstitiis minus crebre sat perspicue punctulatis; prothorace quam longiori duplo latiori, antice fortiter sinuatim emarginato, postice bisinuato, lateribus sat arcuatis, angulis anticis mucronatis sat acutis posticis fere nullis; elytris sat fortiter minus crebre punctulatis, crebre verrucosis (fere ut *P. carnosæ*, Baly), angulis humeralibus (a latere visis) rotundatis deorsum parum directis, margine pone humerum laterali vix concavo; prosterno lato (vix quam *P. geographicæ*, Baly, angustiori) longitudinaliter sulcato. Long., 4 l.; lat., 3 l.

The sculpture of the elytra is extremely like that of *P. carnosa*, Baly, but the raised spaces all being of testaceous-brown color and the interstices all blackish the appearance is that of a black surface covered with closely and regularly placed raised pale blotches. The elytral sculpture compared with that of *P. reticulata* shows verrucæ almost as closely placed, but individually larger and not becoming smaller and more crowded towards the apex. This species is not capable of confusion with any other yet described; it most resembles the species that I take (and my determination agrees with Dr. Chapuis') to be *P. ornata*, Marsh., which, however, is a considerably smaller and much more nitid species with very much less closely verrucose elytra. Viewed from the side the summit of the outline curve of the upper

surface is just about the centre of the insect (*i.e.*, a little in front of the middle of the elytra), and the greatest height (the insect still being inspected from the side) is about half the length of the elytra.

N. Territory of S. Australia.

P. colorata, sp. nov. Fem. Ovata; convexa, elytris ante medium (ut *P. consimilis*, Baly) subgibbosis; lutea, antennis extrorsum obscurioribus, elytris maculis lævibus pallide flavis plurimis ornatis, ex his 4 quam ceteræ majoribus (sc. 1 pone basin ad latitudinem mediam, 1 mox intra marginem lateralem ad longitudinem mediam, 1 longe pone longitudinem mediam suturam versus, 1 communi in sutura ante medium); capite sat crebre sat subtiliter punctulato, subtiliter longitudinaliter impresso; antennis quam corporis dimidium brevioribus, articulo 3° quam 1us vix longiori; prothorace quam longiori duplo latiori, antice sinuatim fortiter emarginato, postice leviter bisinuato, in disco subtiliter sparsius acervatim (ad latera crasse) punctulato, interstitiis subtilissime punctulatis, lateribus minus arcuatis profunde bis emarginatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus vix latioribus, sat crebre (fere ut *P. marmoreæ*, Oliv.) fusco-punctulatis, interstitiis subtilissime sparsissime punctulatis antice planis apicem versus obsolete rugulosis, angulis humeralibus (a latere visis) sat rotundatis deorsum parum productis; prosterni parte mediana modica, longitudinaliter sulcata. Long., 5 l.; lat., $3\frac{9}{10}$ l.

This species is very like *P. marmorea*, Oliv., having its elytral pattern scarcely different, except in the larger spots being larger than the corresponding ones in *marmorea* and the spot near the lateral margin being much more conspicuous; but these characters may be variable. From all the allied species having a pattern (except *consimilis*), this one, however, is easily separated by its elytra not evenly convex, but with a distinct indication of rising into a kind of hump a little behind the base, and from them all it is distinguished also by its elytral interstices quite flat except near the apex, and even there only feebly rugulose.

Queensland; unique in my collection.

P. glauca, sp. nov. Fem. Sat late ovalis; convexa; minus nitida; sordide flavo-viridis; capite sat crebre sat subtiliter punctulato, antice breviter longitudinaliter impresso; antennis quam corporis dimidium vix longioribus, articulo 3° quam 1us sub-breviori; prothorace quam longiori plus quam duplo latiori, antice sat fortiter vix sinuatim emarginato, postice leviter bisinuato, in disco sat crebre sat æqualiter minus fort-

titer (ad latera crasse) punctulato, interstitiis subtilissime punctulatis, lateribus sat arcuatis sat fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis ; elytris quam longioribus vix latioribus, crebre fortiter (quam *P. Waterhousei* paullo magis crebre magis crasse) punctulatis, interstitiis subtilissime sparsim punctulatis leviter sat æqualiter rugulosis, angulis humeralibus (a latere visis) rotundatis vix deorsum productis ; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., $4\frac{1}{2}$—$5\frac{1}{3}$ l. ; lat., $3\frac{1}{5}$—$3\frac{1}{2}$ l.

This is a very distinct species bearing a general superficial resemblance to *P. Waterhousei*, Baly, but with the prothorax bisinuate laterally, the elytra more closely and less finely punctulate with the interstices of their punctures distinctly more rugulose, &c.

S. Australia.

P. mystica, sp. nov. Fem. Ovalis ; convexa ; sat nitida ; testacea, elytrorum disco bifasciatim infuscato ; capite cum prothorace ut præcedentis sculpturato sed illo haud longitudinaliter impresso ; antennis quam corporis dimidium haud longioribus, articulo 3° quam 1us haud longiori ; prothorace quam longiori vix duplo latiori, antice fortiter vix sinuatim emarginato, postice bisinuato, lateribus minus arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis ; elytris quam latioribus vix longioribus, sparsim sat fortiter (fere ut *P. obsoletæ*, Oliv.) punctulatis, interstitiis subtilissime punctulatis leviter subobsolete (fere ut *P. obsoletæ*) convexis, angulis humeralibus (a latere visis) minus rotundatis vix deorsum productis ; prosterni parte mediana sat lata, longitudinaliter sulcata. Long., 6 l. ; lat., $4\frac{1}{4}$ l.

This species closely resembles *P. obsoleta* in respect of the sculpture of its elytra, but differs much from that insect in its larger size, much less transverse and more strongly punctured prothorax, narrower form, &c. The markings on its elytra (if constant) furnish a very distinctive character. The whole disc of each elytron is of a dark-fuscous color (the punctures on this color being also dark-fuscous), except a space in front of and another behind the middle ; thus the lateral portions of the elytra are of the general color (testaceous), while the rest of the surface presents dark coloring along the base and two dark fasciæ, one at, the other behind, the middle.

S. Australia.

P. variegata, sp. nov. Mas. Late ovalis ; subrotundata ; convexa ; sat nitida ; rufo-testacea, antennis apicem versus plus minusve infuscatis, capite prothoraceque fusco-variegatis,

elytrorum interstitiis hic illic irregulariter flavis ; capite sat crebre minus fortiter punctulato, longitudinaliter impresso ; antennis quam corporis dimidium longioribus, articulo 3° quam 1us vix longiori ; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat fortiter (ad latera crasse) punctulato, lateribus modice arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis ; elytris quam longioribus sat latioribus, fortiter sat crebre (fere ut *P. carnosæ*, Baly) fusco-punctulatis, interstitiis lævibus obsolete irregulariter (fere ut *P. obsoletæ*, Oliv.) inæqualibus, angulis humeralibus (a latere visis) rotundatis, vix deorsum productis ; prosterni parte mediana modica, longitudinaliter sulcata. Long., $4\frac{1}{5}$ l. ; lat., $3\frac{4}{5}$ l.

This species is much like *P. carnosæ*, Baly, in general appearance and is similarly colored, having many of the rugulose interstices of the elytra yellow so as to produce the appearance of the elytra bearing numerous small yellow specks, which are unevenly distributed in such fashion that the elytra can be regarded as having yellow as their ground color and three indistinct reddish fasciæ as their markings ; in none of the specimens I have seen of this insect is there any trace of the obscure dark piceous patches that are generally more or less traceable on the elytra of *P. carnosa*. From *P. carnosa* the present species differs in the prothoracic puncturation being less close and being arranged in clusters, also in the interstices of the elytral puncturation being less convex—so that the punctures themselves are much more conspicuous, the punctures in *P. carnosa* being less noticeable on account of the depth of the inequalities in which they lie. I have a single female example which is too much broken for exact description, but evidently scarcely differs from the male except in the usual sexual respects, *i.e.*, narrower form, shorter antennæ, &c.

N.S. Wales ; Queanbeyan (Lea), &c.

P. mutabilis, sp. nov. Mas. Late ovata, apicem versus fortiter dilatata ; convexa ; minus nitida ; sordide viridis (nonnullorum exemplorum mortuorum colore plus minus in rufo-testaceum transeunti), antennis apicem versus infuscatis ; capite longitudinaliter vix impresso cum prothorace sat crebre fortius punctulato (fere ut *P. carnosæ*, Baly) ; antennis quam corporis dimidium vix longioribus, articulo 3° quam 1us haud longiori ; prothorace quam longiori plus quam duplo latiori, antice vix sinuatim fortiter emarginato, postice leviter bisinuato, ad latera sat crasse ruguloso, lateribus minus arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis ; elytris quam longioribus paullo latior-

ibus, crebre fortiter punctulatis (quam *P. carnosæ*, paullo magis crebre), interstitiis sparsim fortius punctulatis modice elevatis, angulis humeralibus (a latere visis) vix rotundatis deorsum nullo modo productis; prosterni parte mediana modica, longitudinaliter sulcata. Long., $4\frac{4}{5}$ l.; lat., 4 l.

A very distinct species owing to its strongly ovate form recalling to mind the Tenebrionid genus *Byrsax* (figured in Journ. Ent., I., pl. iii., fig. 7).

The absence of a sinuation on the margin of the elytra behind the shoulder is also a notable character.

S. Australia; Yorke's Peninsula.

P. convexa, sp. nov. Fem. Ovata; minus nitida; valde convexa, elytris ante medium (ut *P. consimilis*, Baly) subgibbosis; rufo-testacea; capite prothoraceque ut præcedentis sculpturatis; antennis quam corporis dimidium brevioribus, articulo 3° quam 1us vix longiori; prothorace quam longiori duplo latiori, cetera ut præcedentis; elytris quam latioribus vix longioribus, fere ut *P. reticulatæ*, Marsh., sculpturatis set etiam magis fortiter verrucosis, angulis humeralibus (a latere visis) vix rotundatis, deorsum vix productis; prosterni parte mediana sat lata, longitudinaliter sulcata, sulci fundo longitudinaliter convexo. Long., $5\frac{1}{5}$ l.; lat., 4 l.

With the form and elytral sculpture of *P. reticulata*, Marsh., this species has the prothorax closely and on the disc evenly punctulate with its sides strongly bisinuate, and the elytra subgibbous behind the scutellum as in *P. consimilis*, Baly. The last-named character distinguishes it from all the allied species, with which it is otherwise capable of confusion.

S. Australia; Fowler's Bay.

P. latissima, sp. nov. Mas. Subcircularis; sat nitida; sat convexa; sordide flavescens elytrorum disco infuscato; capite crebre subtilius punctulato, longitudinaliter vix manifeste impresso; antennis quam corporis dimidium sat longioribus, articulo 3° quam 1us vix longiori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco acervatim sat crebre sat fortiter (ad latera crasse) punctulato, interstitiis sparsim subtilius punctulatis, lateribus sat arcuatis sat fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus multo latioribus, grosse sat crebre punctulatis, interstitiis inæqualiter valde elevato-rugulosis, angulis humeralibus (a latere visis) rotundatis deorsum vix productis; prosterni parte mediana modica, longitudinaliter sulcata. Long., $4\frac{2}{5}$ l.; lat., 4 l.

Remarkable for the extreme coarseness of its elytral sculpture,

which character suffices alone to separate it from its described allies.

S. Australia.

P. bella, sp. nov. Mas. Sat late ovata; sat nitida; sat convexa; subtus niger, plus minusve flavo-notata; supra flavo-lutea, antennis (basi excepta) nigris, pedibus nigris plus minusve flavo-notatis; capite crebre subtilius punctulato, longitudinaliter parum impresso; antennis quam corporis dimidium sat longioribus, articulo 3° quam 1us paullo longiori; prothorace quam longiori plus quam duplo latiori, antice sinuatim fortiter emarginato, postice obsolete bisinuato, in disco acervatim sat crebre sat fortiter (ad latera crasse) punctulato, interstitiis subtilissime sparsim punctulatis, lateribus modice arcuatis fortiter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus parum latioribus, fortiter subcrebre (ut *P. porosæ*, Er.) punctulatis, interstitiis sparsim punctulatis antice sat planis apicem versus subverrucosis, angulis humeralibus (a latere visis) minus rotundatis deorsum manifeste productis; prosterni parte mediana modica, longitudinaliter sulcata, sulci fundo postice longitudinaliter convexo. Long., $5\frac{3}{5}$ l.; lat., $4\frac{1}{5}$ l.

This species has much superficial resemblance to *P. porosa*, Er., but differs from it by considerably larger size, flatter elytral interstices (especially in front), &c., and especially by the different shape of the prosternum.

Australia; I have no record of the exact locality.

P. Zietzi, sp. nov. Fem. Sat late ovata; sat nitida; convexa; pallide flavo-testacea, antennis (basi excepta) nigris; capite crebre subtiliter punctulato, longitudinaliter perspicue subtiliter impresso; antennis quam corporis dimidium paullo brevioribus, articulo 3° quam 1us breviori; prothorace quam longiori paullo plus quam duplo latiori, antice sinuatim fortiter emarginato, postice leviter bisinuato, in disco acervatim subtilius minus crebre (ad latera sat crasse nec crebre) punctulato, interstitiis subtiliter punctulatis, lateribus sat arcuatis distincte leviter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam longioribus vix latioribus, minus crebre minus fortiter fusco-punctulatis, interstitiis leviter inæqualiter convexis, angulis humeralibus (a latere visis) leviter rotundatis deorsum leviter productis; prosterni parte mediana minus lata longitudinaliter sulcata. Long., 4 l.; lat., $3\frac{1}{5}$ l.

This species resembles *P. obsoleta*, Oliv., but differs from it (apart from color) by its somewhat narrower form, its less trans-

verse prothorax, the finer puncturation and less elevated interstices of its elytra, and the distinct prominence (in a downward direction) of its humeral angles.

S. Australia; taken by Mr. Zietz near Lake Callabonna.

P. intermedia, sp. nov. Fem. Ovata; modice nitida; convexa; testacea, elytris rufescentibus; capite sat crebre sat subtiliter punctulato, longitudinaliter impresso; antennis quam corporis dimidium longioribus, articulo 3° quam 1us multo longiori; prothorace quam longiori paullo magis quam duplo latiori, antice sinuatim fortiter emarginato, postice bisinuato, in disco sat fortiter minus crebre (ad latera crasse) punctulato, interstitiis sparsim subtilissime punctulatis, lateribus modice arcuatis leviter bisinuatis, angulis anticis mucronatis posticis fere nullis; elytris quam latioribus vix longioribus, fortiter minus crebre punctulatis, interstitiis (parte circa scutellum posita excepta) fortiter confertim subseriatim verrucosis, angulis humeralibus (a latere visis) sat rotundatis deorsum manifeste productis; prosterni parte mediana minus lata, longitudinaliter sulcata. Long., $5\frac{3}{5}$ l; lat. 4 l.

This is a remarkable species, linking Dr. Chapuis' first group of *Paropsis* to his fourth group. The sculpture of its elytra is almost exactly as in *P. aspera*, Chp. (of the fourth group), excepting in the verrucæ of the alternate interstices not being markedly different from those of the other interstices, and the seriate arrangement of the verrucæ being less regular. The disposition of the sculpture cannot without qualification be called either "confused" or "seriate," but I think the bisinuation of the sides of the prothorax should settle the doubt in favor of the first group. The puncturation of the elytra is almost invisible except near the scutellum, being buried in the deep interstices of the verrucæ.

N.S. Wales.

CANDEZEA.

C. Leai, sp. nov. Oblonga; rufo-testacea, antennis (basi excepta) et elytrorum macula magna mox ante apicem posita nigropiceis, tarsis plus minusve infuscatis; antennarum articulo basali quam 4us vix breviori 3° quam 2us vix longiori; capite prothorace que vix manifeste, elytris crebre subtiliter, punctulatis; corpore subtus parce pubescenti; epipleuris postice anguste fere ad apicem continuatis. Long. 2 l.; lat., $\frac{9}{10}$ l.

This species is easily recognisable by its color and markings, but I have some hesitation in referring it to *Candezea*. Dr. Baly (Jour. Linn. Soc. xx.) thinks that the prolongation of the elytral epipleuræ is not inconsistent with *Monolepta*. Jacoby (Ann. Mus. Genov. 1886, p. 116), on the contrary, argues that all the so-called *Monoleptæ* having the epipleuræ prolonged should be

removed from the genus. Following Jacoby I have referred the present insect to *Candezea* on account of its epipleuræ being very manifestly (not excessively narrowly) continued nearly to the apex of the elytra, but a casual glance would unhesitatingly place it in *Monolepta* of which it has entirely the facies. The blackish spot occupies nearly the entire apical-half of each elytron, scarcely reaching the suture, being very distinctly separated from the lateral margin and divided from the apex by a space nearly equal to a quarter of its own length. The anterior coxæ are quite closed posteriorly.

N.S. Wales; taken by Mr. Lea.

COCCINELLIDÆ.

CŒLOPHORA.

C. gratiosa, Muls. Mr. Kœbele has sent me a remarkable series of specimens which must, I think, be attributed to this species. He writes that he is confident they must all be regarded as conspecific, nearly all having been bred from one batch of similar pupæ found on a single orange tree. I am disposed to think he is right, although if it be so *C. gratiosa* is one of the most variable of the *Coccinellidæ*. I can find no characters to distribute the examples before me, except in respect of color and markings, but these vary to an almost incredible extent, scarcely any two of them being alike. One specimen among them agrees very well with the description of *C. gratiosa* except in most of the yellow portions being of a *pale* (almost *whitish*) yellow color, but in other specimens (which, however, vary in other respects from the description) of the series the yellow color is as Mulsant characterises it. The following is a description of the markings on the example that I regard as almost typical:—Head bright yellow with a continuous black border along the front of the clypeus and running back on either side so as to touch the post-ocular sinuosity to the middle of the lateral edge, the hinder half of the lateral edge and the whole of the base being black [there is a narrow yellow line along the front of the prothorax not mentioned in the description, but this is wanting in others of the series]; scutellum black; elytra whitish-yellow with all their margins narrowly black and a very wide black fascia occupying nearly the middle half of their length, this fascia being angularly produced on its front margin on the disc of each elytron and on its hindmargin correspondingly emarginate, the sutural black border being dilated from the scutellum to the fascia in such manner as to present the appearance of a triangle whose apex touches the scutellum while its base is merged in the fascia.

Regarding the specimen I have described as the type, the next

example (var. A) varies in there being two large yellowish-white spots in the fascia on each elytron, but otherwise is identical. Var. B is identical with var. A, except in the angular projection of the fascia on the disc of each elytron being continued forward to the base of the elytron (so that this var. may be regarded as having black elytra, each bearing five large whitish-yellow spots). Var. C differs from B only in the yellow coloring being very much brighter, and the yellow front margin of the prothorax being absent. Var. D is best compared with B, from which it differs in the front margin of the prothorax being *widely* yellow, while there are two yellow spots on the disc near the base, and in the great diminution of black marking on the elytra, the lateral black border having disappeared and the other black markings being represented by markings of similar form, but of a pale brown color, which here and there, however, deepen into black. Var. E seems to be a development of D, having the discal black of the prothorax not only edged in front, but also traversed near the base by yellow, and having the elytra entirely edged with black, as in C, but with the black fascia transformed into an ill-defined pale-red blotch, roughly resembling the fascia in the typical form (but with its anterior extension mnch as in B and C), yet not reaching the lateral margin. [Without the intermediate forms var. E could certainly not be connected with the type]. Var. F. resembles E except in the anterior extension of the elytral fascia being absent. Var. G. is entirely of a yellowish-testaceous color except the lateral margin of the prothorax in its hinder part, the scutellum, and all the elytral edges are black. (*C. versipellis*, Muls., is extremely like this var., but is much larger and I think distinct.) Var. H is like G, but with the elytra opaque owing to close asperate puncturation; a singular variation, which I have observed in several of the Australian *Coccinellidæ*. In all these specimens the undersurface, legs, and antennæ agree with Mulsant's description of the type. M. Mulsant unites *C. gratiosa* with *patruelis* in his Monograph of the *Coccinellidæ* (p. 276) and I should think it not unlikely he may be right in doing so, although Mr. Crotch in his "Revision" seems to regard them as distinct. I have not seen a specimen, however, that agrees with M. Mulsant's description of *C. patruelis* and therefore am not in a position to express a decided opinion on the point.

C. veranioides, sp. nov. Ochracea; prothorace nigronotato; elytrorum marginibus (basali excepto) omnibus et vitta discoidali (hac nec basin nec apicem attingenti in medio constricta vel interrupta), corpore subtus (abdominis lateribus exceptis), pedibusque (tibiis anticis tarsisque omnibus exceptis) nigris; prothorace elytrisque subtiliter minus

crebre punctulatis ; prosterno bicarinato ; metasterno antice truncato ; abdominis laminis nec apicem nec marginem lateralem segmenti attingentibus. Long., $1\frac{3}{4}$—$2\frac{1}{5}$ l. ; lat., $1\frac{1}{2}$—$1\frac{4}{5}$ l.

The black marks on the prothorax are a basal fascia, the front margin of which is sinuous, and there are two discal spots immediately in front of the basal fascia (in some examples joined to it). The black lateral margin of the elytra is dilated in the middle; the sutural black margin is more or less dilated a little before the apex. This species is apparently near to *C. Ripponi*, Crotch, but differs in being much smaller, with the discoidal vitta of the elytra not reaching the base, and constricted in the middle (interrupted in some examples). I should suppose it to be possibly a var. of *Ripponi*, were it not that Mr. Crotch expressly states that in that species the abdominal lamella reaches the lateral margin of the segment.

N.S.W. ; taken by Mr. Koebele on Harwood Island.

ORCUS.

O. nummularis, Boisd. Mr. Koebele informs me that this is certainly a good species and that its larva is quite different from that of *O. Australasiæ*, Boisd., of which insect it has been considered a variety.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1893-94.

ORDINARY MEETING, NOVEMBER 7, 1893.

Prof. R. TATE (President) in the chair.

BALLOT.—AUGUSTUS SIMSON, of Hobart, Tasmania, was elected a Fellow.

EXHIBITS.—Prof. R. TATE exhibited specimens of ochres interstratified between archæan quartzites on the coast cliffs near the Gorge of Pedler's Creek, Noarlunga, which may possibly be the residual products from the decomposition of volcanic ash. If such should be the case, it would prove them to be the oldest volcanic rocks in Australia. J. G. O. TEPPER, F.L.S., showed some new cockroaches from Northern Queensland and the Northern Territory.

PAPER.—"The Anthropology of the Elder Exploring Expedition," by RICHARD HELMS.

ORDINARY MEETING, DECEMBER 5, 1893.

Prof. R. TATE (President) in the chair.

EXHIBITS.—S. DIXON exhibited minerals illustrative of the gold-bearing rocks of the Murchison Goldfields, W.A. The reefs occurred either in diorite or granite. In the former the quartz was dark; in the latter, white. The gold-bearing area appeared to be of wider extent than in any other part of the world. In connection with the reefs, a moderate supply of fresh water was generally found from 80 to 100 feet; deeper the water became salt. J. G. O. TEPPER, F.L.S., exhibited the colored leaf of *Pancratium rotatum* and a diseased leaflet of *Ceratonia siliqua*, which had been reported upon by Mr. D. MCALPINE. The former he considered due to climatic conditions; the latter to the ravages of the pear-mite, *Phytoptus pyri*.

PAPERS.—"Origin and Nature of the Volcanic Bombs of Central Australia," by Prof. STELZNER; and "Notes on *Orthoceras strictum*," by J. G. O. Tepper, F.L.S., who characterised one of its varieties, and proposed for it the name of *O. succulenta*.

ORDINARY MEETING, MARCH 6, 1894.

MAURICE HOLTZE (Vice-President) in the chair.

ELECTION OF AUDITOR.—Mr. D. J. ADCOCK was elected the Auditor for the current year.

EXHIBITS.—OSWALD LOWER, F. Ent. S., exhibited a portion of his large collection of Queensland Lepidoptera recently collected. J. G. O. TEPPER, F.L.S., showed some galls forwarded by Mr. F. M. Bailey (Gov. Botanist of Queensland) from Taylor's Range, near Brisbane.

PAPERS.—"Supplementary and Additional Descriptions of the *Blattariæ* of Australia and Polynesia," by J. G. O. TEPPER, F.L.S. "Descriptions of *Microlepidoptera* from Moreton Bay, Queensland," by A. JEFFERIS TURNER, M.D. "Descriptions of the Larvæ of some S.A. Lepidoptera," by E. GUEST.

ORDINARY MEETING, APRIL 3, 1894.

Prof. R. TATE (President) in the chair.

BALLOT.—JAMES A. KERSHAW, Entomologist National Museum, Melbourne, and A. JEFFERIS TURNER, M.D., Brisbane, were elected Fellows.

EXHIBITS.—W. HOWCHIN, F.G.S., exhibited a large slab of polished Cambrian limestone from twelve miles north of Blinman, forwarded by Mr. Parkes, Inspector of Mines. It consisted of an antique type of coral. He also showed a new foraminifer from Muddy Creek, Victoria, named by M. Schlumberger, of Paris, *Trillina Howchini*. WALTER GILL, F.L.S., Conservator of Forests, laid on the table a fine sample of dates grown at Hergott. Prof. TATE, F.G.S., exhibited the casts of three pleiosaurian vertebræ from the Lake Eyre Basin; also a Jurassic Pecten from Western Australia; also glaciated stones from Bacchus Marsh, Victoria, forwarded by Mr. Sweet. W. B. POOLE demonstrated under the microscope the fungoid character of some discolorations on a leaf of *Pancratium rotatum*.

PAPERS.—"Notes on a New Classification of *Brachyscelid Galls*," by W. W. FROGGART. "Flora of Leigh's Creek Formation," by G. SWEET, F.G.S.

Ordinary Meeting, May 1, 1894.

Prof. R. Tate (President) in the chair.

Exhibits.—W. Howchin, F.G.S., laid on the table a collection of native stone implements collected at McDonnell Bay, S.A. J. G. O. Tepper, F.L.S., exhibited a fungus obtained by Mr. A. Molineux in the mallee scrub of Victoria near the S.A. boundary. It apparently belonged to the genus *Strombilomyces*. It was remarkable for having a large conical base largely made up of mineral matter. The stem and pileus were of a woody hardness. Also specimens of *Pyrameis cardui* from Europe, India, California, and South Australia, which were almost identical in appearance. W. H. Selway showed a specimen of *Alectoria superba* (Brunner) from the Far North of South Australia. This was the third specimen collected in South Australia.

Papers.—"Remarks on S.A. *Rhopalocera*," by Oswald Lower, F. Ent. S. "New Australian *Heterocera*," by Oswald Lower, F. Ent. S. "Descriptions of New Coleoptera," by Rev. Thomas Blackburn, B.A. "The Myology of *Notoryctes*, with Comparative Notes," by Prof. Wilson, M.D. "Supplementary Note on the Osteology of *Notoryctes*," by E. L. Stirling, M.D., F.R.S. "On the Occurrence of the Fissurellid genus *Zidora* in Australian Waters," by Prof. R. Tate.

Ordinary Meeting, June 5, 1894.

Rev. Thomas Blackburn, B.A. (Vice-President), in the chair.

Exhibits.—D. J. Adcock exhibited fossils and casts of large species of *Turbo*, *Trochus*, *Voluta*, *Conus*, and, probably, *Natica*, from a limestone formation at Tickera Bay, Yorke Peninsula. J. G. O. Tepper, F.L.S., showed specimens of a primary rock formation on the Lower Sturt River to the east of the South Road.

Papers.—"Classification of Igneous Rocks," by Charles Chewings, Ph. D. "Notes on the Sedimentary Rocks in the McDonnell and James Ranges," by Charles Chewings, Ph. D.

Ordinary Meeting, July 3, 1894.

Maurice Holtze, F.L.S. (Vice-President), in the chair.

Exhibits.—Charles Chewings, Ph. D., exhibited rock specimens from Toy's Reef, Mount Pleasant. He stated that the dyke belonged to the pegmatitic series of dyke formations, not having the structure of an injected plastic mass of granite. Some

of the granite had a distinctly "graphic" arrangement. He considered the structure as favorable for the occurrence of rare and valuable minerals. He thought that the dyke had been formed after the surrounding schists had received their present general disposition, but some movement had transpired since the dyke was formed. J. G. O. TEPPER, F.L.S., exhibited photographs of the fungus exhibited at the May meeting, and which had been named *Laccocephalum basilapiloides* (McAlpine and Tepper). M. HOLTZE, F.L.S., referred to an imported weed, *Stachys arvensis*, which he showed, as being reported to be poisonous to stock.

PAPER.—On the formation of Granite," by J. G. O. TEPPER, F.L.S.

ORDINARY MEETING, AUGUST 7, 1894.

Rev. THOMAS BLACKBURN, B.A. (Vice-President) in the chair.

EXHIBITS.—CHARLES CHEWINGS, Ph.D., exhibited a collection of Ammonites from various parts of Europe illustrative of the Middle Lias. W. HOWCHIN, F.G.S., showed a specimen of slag from Broken Hill Proprietary Mine resembling Peel's hair, and which was formed whenever the orifice of the vent became blocked. J. G. O. TEPPER, F.L.S., exhibited some foreign *Curculionidæ;* also a specimen of iron ore with cubical faces, supposed to be a pseudomorph of hæmatite; also a sample of linoleum made of cork-dust, and adapted for the use of entomologists.

PAPER.—"*Omalanthus Leschenaultianus* and Red-water in the Northern Territory," by M. HOLTZE, F.L.S.

ORDINARY MEETING, SEPTEMBER 4, 1894.

Prof. RALPH TATE (President) in the chair.

MALCOLOGICAL SECTION.—The PRESIDENT reported that the Council had approved of a new Section of the Society being formed for the special study of molluscan forms of life, to be called the Malacological Section.

EXHIBITS.—Prof. RALPH TATE exhibited a collection of fossils illustrative of the McDonnell Ranges, Central Australia, with explanatory remarks of the general physical and geological features of the country.

PAPER.—"Description of *Hadra Adcockiana*," by W. T. Bednall.

Annual Meeting, October 2, 1894.

Prof. Ralph Tate (President) in the chair.

Exhibits.—W. Howchin, F.G.S., exhibited a cluster of tabular crystals of barite from Mitcham quarry, Adelaide. J. G. O. Tepper, F.L.S., showed a case of weevils.

Ballot.—Prof. Wilson, M.D., of Sydney University, was elected an Hon. Fellow.

Report.—The Annual Report of the Council and balance-sheet of the Society were read and adopted.

Election of Council.—The Council for the ensuing year was elected as follows :—President, Prof. Tate ; Vice-Presidents, Rev. Thos. Blackburn, B.A., and Maurice Holtze, F.L.S. ; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretaries, W. L. Cleland, M.B., and W. B. Poole ; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, M.D., C.M.G., F.R.S., Walter Howchin, F.G.S., Samuel Dixon, J. S. Lloyd, and W. H. Selway.

Election of Auditor.—D. J. Adcock was elected Auditor for the ensuing year.

Votes of Thanks.—A vote of thanks was carried to the Hon. Treasurer, Hon. Secretaries, and Auditor for their services during the past year.

Papers.—"Diagnoses of Central Australian Land Shells," by Prof. R. Tate. "Descriptions of Australian Coleoptera," by Rev. Thos. Blackburn, B.A.

Special Exhibits.—Prof. Tate exhibited new species of Central Australian Flora, with explanatory remarks.

ANNUAL REPORT.

The Council has to report that the scientific work of the Society has been carried on successfully during the past year. Owing to unavoidable delay in printing the earlier papers read during the past year it was decided to issue the Society's volume in an annual instead of a half-yearly form. The Council regrets to report that owing to circumstances over which it had no control the continuance of the printing of the Elder Exploring Expedition volume has been delayed.

During the past year three new Fellows have been elected, and one Fellow has resigned.

The Council has the melancholy duty of reporting the death of two Fellows—Mr. Gregory Board, Metallurgist Port Pirie Smelting Works, and Rev. W. R. Fletcher, M.A.

The membership of the Society consists at the present time of 11 Hon. Fellows, 75 Fellows, 16 Corresponding Members, and 1 Associate.

Three new exchanges with learned Societies and publishers have been made, namely, the Annuaire Géologique, the Manchester Geological Society, and the Department of Agriculture of Washington, U.S.

At the request of several Fellows interested in the molluscan fauna the Council has favorably considered the application for the formation of a Malacological Section of the Royal Society, South Australia, and granted permission for the same.

During the past year some prominent Fellows of the Society have been closely identified with two scientific undertakings in the colony. The one was the collection and preservation of the diprotodon and other fossil remains from Lake Callabonna, the success of which was largely due to the indefatigable energy and skill of Mr. A. Zietz, the Assistant Director of the Adelaide Museum. The other was the Horn Exploring Expedition, in which both Dr. Stirling, F.R.S., and Prof. Tate, F.L.S., were leading members.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
Oct. 1, 1893.						
To Balance				104	1	2
" Subscriptions—						
Royal Society	64	1	0			
Field Naturalists' Section ...	13	10	0			
Microscopical Section	2	0	0			
Astronomical Section	10	17	6			
				90	8	6
" Grant from Government				92	16	6
" Interest				1	18	9
				£289	4	11

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing and Binding (Half-year)	58	6	6			
Illustrating	28	10	0			
Publishing (Half-year)	4	0	0			
				90	16	6
" Wages—Caretaker				3	0	0
" Printing, Postage, and Stationery ...				5	9	6
" Advertising				4	16	8
" Library—Carriage of Books... ...				0	11	6
" Grants—Field Naturalists' Section...	10	0	0			
Astronomical Section ...	12	0	0			
				22	0	0
" Shelving				0	8	0
" Stamp Duty				0	2	6
Sept. 30, 1894.						
" Balance—Union Bank	158	13	6			
Savings Bank	3	6	9			
				162	0	3
				£289	4	11

Audited and found correct.

D. J. ADCOCK, Auditor.

October 2, 1894.

WALTER RUTT, Treasurer.

DONATIONS TO THE LIBRARY

For the Year 1893-94.

TRANSACTIONS, JOURNALS, AND REPORTS.

Presented by the respective Societies, Editors, and Governments.

Argentine States.

Buenos Aires—Boletin de la Academia Nacional de Ciencias, tome XII, 1890.

Austria and Germany.

Berlin—Verhandlungen Gesellschaft für Erdkunde, band XX., No. 7 ; XXI., Nos. 1 to 6.
——— Zeitschrift, ditto, band XXVIII., No. 6 ; XXIX., Nos. 1 and 2.
——— Sitzungsberichte Königlich Preussischen Akademie der Wissenschaften zu Berlin, No. 1 to 25, 1893.
——— Abhandlungen der Königlich Preussischen Meteorologischen Instituts. Ergebnisse Beobachtungen an den Stationen, II. and III. ordnung.
Bonn—Naturhistorischen Vereins der Preussischen—Rheinlande Westfalens und des Reg.-Bezirks Osnabruck, verhandlungen Hälfte, 1893.
Gottingen Nachrichten von der K. Gesellschaft der Weissenschaften u der Georg-August Universitat. Nos. 11 to 14, 1893 ; 1 to 16, 1892 ; 1 to 21, 1893 ; 1 and 2, 1894.
Vienna—Verhandlungen der K. K. Geologischen Reihesanstalt, No. 6 to 10, 1893 ; 1 to 9, 1894 ; 1 to 18, 1893.
——— Kaiserliche Akad. der Wissenschaften in Wien, 1894, Nos. 1 to 19.
——— Annalen des K. K. Naturhistorisches Hofmuseum, band VIII., Nos. 3 and 4.
——— Verhandlungen K. K. Zoologisch-Botanischen Gesellschaft in Wien, Band XVIII, Nos. 1 and 2.
Würzburg—Sitzungsberichte der Physikalisch-Medicinischen Gesellschaft, No. 1 to 11, 1893.

Canada.

Montreal—Canadian Record of Science; vol. V., Nos. 6 and 7.
——— Geological Survey of Canada; Annual Report; vol. V., parts 1 and 2, with maps.

Toronto—Canadian Institute; Fifth Annual Report, Session 1892-3; Seventh Annual Report, 1894. Transactions, vol. III., part 2; vol. IV., part 1.

Halifax—Proceedings Nova Scotian Institute of Natural Science; vol. I., part 2, second series.

CAPE COLONY.

Cape Town—Transactions Philosophical Society; vol. V., part 2; vol. VII., part 2; vol. XVIII., part 1.

CHILE.

Santiago—Actes de la Société Scientifique; tome III., 1893, and tome IV., 1894.

——— Verhandlungen des Deutschen Wissenschaftlichen Vereins; band II., heft 5 and 6.

FRANCE.

Nantes—Bulletin de la Société des Sciences Naturelles de l'Ouest de la France, tome 3, tome 4, No. 1.

Marseilles—Annales de Faculté des Sciences, tomes I., II., III.

Paris—Feuilles des Jeunes Naturalistes, series III., Nos. 276 to 285, des Sciences Société.

—— Bulletin Entomologique, pp. 1 to 272, 1893; pp. 1 to 13, 1894.

—— Annuaire Geologique Universel, tome IX, parts 1 to 4.

GREAT BRITIAN AND IRELAND.

Belfat—Reports and Proceedings Belfast Natural History and Philosophical Society, session 1892-93.

Dublin—Royal Irish Academy Proceedings, vol. II., Nos. 4 and 5; vol. III., No. 1 and 2.

——— Transactions ditto, vol. XXX., parts 5 to 10.

——— Scientific Proceedings Royal Dublin Society, vol. IV., series 2; vol. V., series 2; vol. VII., part 5; vol. VIII., parts 1 and 2.

Edinburgh—Royal Physical Society, session 1892-3.

———— Royal Society of Edinburgh, vol. XIX., 1891-2.

———— Geological Society Transactions, vol. VI., part 1; roll to March, 1893.

London—Journal Royal Microscopical Society, parts 5 and 6, 1893; parts 1, 2, and 3, 1894.

——— British Museum Catalogue of Birds, vols. 21 and 22.

——— Linnean Society Proceedings, Oct., 1893; May, 1894.

——— Entomological Society Transactions, 1893.

——— Imperial Institute, Annual Report; 1893 Year Book.

——— Proceedings Royal Society, Nos. 326 to 335.

——— Royal Colonial Institute, vol. XXIV., Proceedings.

London—Natural Science, vol. IV., No. 23.
——— Kew Gardens Bulletin, 1893.
Leeds—Journal of Conchology, vol. VII, Nos. 8 to 11.
Manchester—Journal of the Geographical Society, vol. VIII, Nos. 7 to 12 ; vol. IX, Nos. 1 to 9.
——— Field Naturalists' and Archæologists' Society Report and Proceedings, 1892.
——— Geological Society, Transactions, 1893-4, vol. XXII., parts 14 to 18.
——— Memoirs and Proceeding Manchester Literary and Philosophical Society, vol. VIII., No. 1 and 2.

INDIA.

Calcutta—Indian Museum, vol. II., No. 7 ; vol. III., No. 3.

ITALY.

Turin—Bolletino dei Musei di Zoologia ed Anatomia Comparata dello R. Università di Torino, vol. VIII., No. 151 to 154.
Pisa—Atti della Società Toscana di Scienze Naturali, vol. IX., pp. 1 to 61.
Milan—Atti della Società Italiani Scienza Naturali, vol. XXXII., Nos. 1 to 4; vol. XXXIII., Nos. 1 to 3; vol. XXXIV., Nos. 1 to 4.
—— Bulletin Società Entomologica Italiana, parts 1 to 4, 1893; parts 1 and 11, 1894.

JAPAN.

Tokio—Transactions Seismological Society, vol. II., 1893.
—— Journal College of Science, Imperial University, vol. VI., parts 3 and 4; vol. III., 1894; vol. VII., part 1.
—— Journal Tokio Geographical Society, 25th year, 1892 ; 26th year, 1893.

JAVA.

Batavia —Naturkundig Tigdschrift von Nederlandsch - Indie, deel 52 and 53.

MEXICO.

Mexico—Memoirs de la Sociedad Cientifica (Antonio Alzate), tomo VII., Nos. 5 and 6.

NEW SOUTH WALES.

Sydney—Records of the Australian Museum, vol. II., No. 5.
——— Catalogue Australian Birds Report for 1893.
——— Department of Agriculture—Plant Diseases and their Remedies ; Annual Report, 1893.

Sydney—Agricultural Gazette, vol. IV., 9 to 12 ; vol. V., parts 1 to 8.
——— Proceedings Linnean Society ; vol. VIII., parts 2, 3 and 4 ; vol. IX., part 1.
——— Sydney University Calender, 1894.
——— Royal Society Proceedings ; vol. XXVII., 1893.
——— Department of Mines. Records, vol. III., part 4 ; vol. IV., part 1 ; Memoirs Geological Survey, N.S.W., No. 5.
——— Sydney Observatory ; Rain, River and Evaporation Observations, 1892 ; Diagram of Isothermal Lines of N.S.W. ; Meteorite, No. 2 ; Pictorial Rain Maps ; Moving Anticyclones in Southern Hemisphere ; Hailstorms.

NEW ZEALAND.

Wellington — Transactions and Proceedings New Zealand Institute, vol. XXVI.

NORWAY AND SWEDEN.

Stockholm—Geologiska Förening ; band XV., 1893.
Christiana—Den Norske Nordhans Expedition 1876-78 ; XXII., Ophiuriodea.

PORTUGAL.

Porto—Annaes de Sciencias Naturals. First year, No. 1.

QUEENSLAND.

Brisbane—Department of Agriculture, Bulletin, No. VIII., Botany.
——— Geological Survey Office—Reports on Mount Morgan Deposits ; Progress Report, 1893 ; Tawalla and Maruba Goldfields ; Ulam Goldfields ; Deephead Cape River Goldfields.

RUSSIA.

St. Petersburg—Bulletin du Comité Geologique, vol. XII., No. 3 to 7 ; Supplement and tome XII.
——— ——— Société Impériale Mineralogique, vol. 30, second series.
Moscow—Bulletin de la Société Impériale des Naturalistes, No. 4 and No. 1.

SWITZERLAND.

Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles ; vol. XXIX., No. 112 and 113 ; vol. XXX., No. 114.

Geneva—Société de Physique et d'Histoire Naturelle. Compte Rendu des Sciences ; No. X., 1893.

South Australia.

Adelaide—Observatory Meteorological Observations, 1884-85.

Tasmania.

Hobart—Royal Society of Tasmania ; Papers and Proceedings, 1893.

United States.

San Francisco—Proceedings Californian Academy of Sciences, vol. III., part 2 ; Memoirs, vol. II., No. 3, vol. IV. ; Occasional Papers.

———— Zoe, a Biological Journal, vol. II., 1-4.

New York—Transactions New York Academy of Sciences, vol. XII.

———— Annals ditto, vol. VII, Nos. 1 to 5 ; vol. VIII., Nos. 1 to 3.

Philadelphia—Proceedings of Academy Natural Sciences, part I., 1893, January-March.

Cambridge—Bulletin Museum Comparative Zoology at Harvard College, vol. XV., No. 1 ; vol. XVI., No. 13 ; vol. XXIV., No. 6 and 7 ; vol. XXV., No. 1 to 6. Annual Report.

Washington—Bulletin of the U.S. Geological Survey, Nos. 82 to 86 ; Nos. 90 to 96.

———— Eleventh Annual Report, parts 1 and 2.

———— Geology — Eureka District Monographs, vol. XVII. and vol. XVIII.

———— Department of Agriculture — Foods and Food Adulterants, part 8; Report of Statistician, August, 1893, Report of Statistician, September, 1893; Prairie Ground Squirrels of the Mississippi Valley; Annual Report, 1892; Report of Secretary, 1893; Report of Statistician, November, 1893: Report (Crop of the Year); 8th and 9th Annual Reports of Bureau Annual Industry; Report of the Statistician, No. 112.

———— Smithsonian Institution ; Annual Report Smithsonian, 1890 ; Proceedings United States Natural Museum, vol. XIV. ; Bulletin, No. 40 ; Monographs for Collectors, 7 numbers, viz., Birds, Molluscs, Reptiles, Birds' Eggs, Rough Skeleton Fossils, Preserving Insects ; Monograph N. American Prototrypidæ ; Cata-

logue Lepidoptera and Myriapoda of N. America; Proceedings, vol. XV., 1892; Bibliography, Chinookan Languages; Eighth Annual Report, No. 43, W.S. West Museum.

Cambridge—Psyche—Journal of Entomology, vol. VI., Nos. 209 to 221.

———— Journal New York Microscopical Society, vol. IX., No. 4; vol. X., Nos. 1 to 3.

Boston—Proceedings American Academy Art and Science, vol. XIX, 1891-92.

Baltimore—John Hopkins' University Circulars, vol. XIII., No. 111 to 114.

Texas—Academy of Science Transactions, vol. I., No. 2.

Salem—Essex Institute Bulletin, vol. 23, No. 1 to 12; vol. 24, No. 1 to 12.

Sacramento—California State Mining Bureau—Methods of Mine Timbering.

Meriden—Transactions of the Meriden Scientific Association—Annual Address.

Rochester—New York Rochester Academy of Science, vol. II., pp. 113 to 200.

Cincinnati—Journal of Cincinnati Society of Natural History, vol. XVI., No. 1.

St. Louis—Missouri Botanic Gardens Report, 1893.

———— Transactions of the Academy of Sciences of St. Louis, vol. VI., Nos. 2 to 8.

Kansas—Academy of Sciences, vol. XIII., 1891, 1892.

Berkly, California—Bulletin Department of Geology, viz.:—
Post Pliocene Diastoophism of Coast of South California.

———— Eruptive Rocks of Point Bonith.

———— Geology of Carmelo Bay.

———— Soda-Ryolite North of Berkly.

Massachussetts—Tuft's College Studies, No. 1 of 1894.

VICTORIA.

Melbourne—Victorian Naturalist, vol. X., Nos. 6 to 12; vol. XI., Nos. 1 to 5.

———— Transactions Royal Geographical Society of Australia (Victorian Branch), vol. XI.

———— Proceedings; Royal Society of Victoria, vol. VI., new series.

Ballarat—School of Mines' Calendar, 1894; Report, 1893.

Geelong—Gorden Technical College; vol. III., No. 4.

The collected papers of Sir W. Bowman, Bart., by Harriet Lady Bowman.

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1894.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1857. BARKELY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer, Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, N.S.W.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1879. *MUELLER, BARON F. VON, K.C.M.G., F.R.S., M. and Ph.D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer, N.S.W., Sydney, New South Wales.
1894. *WILSON, J. T., M.D., Professor of Anatomy Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888. *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Russell-street, Camberwell, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1878. *HAYTER, H. H., M.A., C.M.G., F.S.S., Government Statist, Melbourne, Victoria.
1880. *KEMPE, REV. J., Australia.
1889. *MACGILLIVRAY, P. H., M.R.C.S., F.L.S., Bendigo, Victoria.
1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Curator Technological Museum, Sydney, New South Wales.
1888. *MASKELL, W. M., Wellington, New Zealand.
1886. NICOLAY, REV. C. G., Fremantle, Western Australia.
1880. *RICHARDS, MRS. A., Georgetown, South Australia.
1892. *SCHULZ, REV. LOUIS.
1883. *STIRLING, JAMES, F.L.S., Assistant Geological Surveyor, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. Adcock, D. J., Adelaide, S.A.
1874. Angas, J. H., Adelaide.
1887. Bagot, John, Adelaide, S.A.
1893. *Bednall, W. T., Adelaide, S.A.
1887. *Blackburn, Rev. Thomas, B.A., Woodville, S.A.
1884. Boettger, Otto, Adelaide, S.A.
1886. *Bragg, W. H., M.A., Professor of Mathematics, University of Adelaide, S.A.
1882. Brown, L. G., Adelaide, S.A.
1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1893. Brummitt, Robert, M.R.C.S., Eng., Kooringa.
1884. Bussell, J. W., F.R.M.S., North Adelaide, S.A.
1891. Calvert, A. F., Adelaide, S.A.
1888. Chapman, R. W.. M.A., B.C.E., Lecturer on Mathematics and Physics University of Adelaide, S.A.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Assistant Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, S.A.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide.
1880. Cox, W. C., Semaphore, S.A.
1887. *Dixon, Samuel, Adelaide, S.A.
1876. Dobbie, A. W., Adelaide, S.A.
1893. Dudley, U., Broken Hill, N.S.W.
1890. *East, J. J., F.G S., Registrar School of Mines, Adelaide, S.A. (Corresponding Member, 1884).
1871. Elder, Sir Thomas, K.C.M.G., Adelaide, S.A.
1886. Fleming, David, Adelaide, S.A.
1882. Fowler, William, Melton, Y.P., S.A.
1889. Fraser, J. C., Adelaide, S.A.
1891. Gill, Walter, F.L.S., Conservator of Forests, South Australia, Adelaide.
1880. *Goyder, George, Jun., F.C.S., Government Analyst South Australia, Adelaide.
1890. Gray, Rev. William, Tanna, New Hebrides.
1887. Grasby, W. C., F.L.S., Agricultural College, Roseworthy, S.A.
1882. Henry, Alexander, M.D., Adelaide, S.A.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, S.A.
1883. *Howchin, Walter, F.G.S., Goodwood, S.A.
1883. Hughes, H. White, Booyoolie, S.A.
1893. James, Thos., M.R.C.S., Eng., Moonta.
1891. Johnson, J., M.D., F.R.C.S., Medical Officer, Mount Gambier Hospital, Assistant Colonial Surgeon, Mount Gambier, S.A.
1853. (F) Kay, Robert, General Director and Secretary S.A. Public Library, Museum, &c., Adelaide, S.A.
1894. Kershaw, James A., Entomologist National Museum, Melbourne.
1884. Lendon, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine University of Adelaide, Hon. Physician Adelaide Hospital and Children's Hospital, North Adelaide, Adelaide, S.A.
1866. Lloyd, J. S., Adelaide, S.A.
1888. *Lower, O. B., F.Ent.S., Parkside, Unley, S.A.
1885. *Lucas, R. B., Adelaide, S.A.
1874. *Magarey, Hon. S. J., M.D., M.L.C., Adelaide, S.A.
1853. Mayo, George, F.R.C.S., Adelaide, S.A.

1874. Mayo, G. G., C.E., Adelaide, S.A.
1882. *Meyrick, E. T., B.A., Ramsbury, Hungerford, Wilts, England.
1888. Molineux, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, S.A.
1859. (L) Murray, David, Adelaide, S.A.
1884. Munton, H. S., Brighton, S.A.
1893. Perks, R. H., M.D., F.R.C.S., Eng., Medical Superintendent Adelaide Hospital, S.A.
1883. Phillips, W. H., Adelaide, S.A.
1886. Poole, W. B., Adelaide, S.A.
1882. Robertson, R., F.F.P.S., Adelaide, S.A.
1885. *Rennie, H. E., M.A., D.Sc., F.C.S., Professor Chemistry University of Adelaide.
1891. Rogers, R. S., M.D., Adelaide, S.A.
1876. *Rutt, Walter, C.E., Adelaide, S.A.
1891. Selway, W. H., Jun., Adelaide, S.A.
1886. Scott, James L., Hyde Park, S.A.
1893. Simson, Augustus, Hobart, Tasmania.
1857, Smeaton, Thomas D., Blakiston, Little Hampton, S.A.
1871. Smith, Robert Barr, Adelaide, S.A.
1882. Smythe, J. T., B.A., B.E., Inspector of Schools South Australia, Glenelg, S.A.
1881. *Stirling, Edward C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Hon. Director S.A. Museum, Hon. Surgeon Adelaide Hospital, Adelaide, S.A.
1893. *Streich, Victor, F.G.S., Adelaide, S.A.
1876. *Tate, Ralph, F.L.S., F.G.S., Professor of Natural Science University of Adelaide.
1886. *Tepper, J. G. O., F.L.S., Entomologist S.A. Museum (Corresponding Member, 1878), Adelaide, S.A.
1856. Todd, Sir Charles, K.C.M.G., M.A., F.R.S., F.R.A.S., Government Astronomer, Postmaster-General, and Superintendent of Telegraphs, S.A.
1894. *Turner, A. Jefferis, M.D., Brisbane.
1889. Vardon, Joseph, J.P., Adelaide, S.A.
1878. *Verco, Joseph C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1883. Wainwright, E. H., B.Sc., St. Peter's College, S.A.
1878. Ware, W. L., Adelaide, S.A.
1879. Way, Edward W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1859. Way, Samuel J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, S.A.
1882. *Whittell, Horatio, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner Adelaide, Adelaide, S.A.
1886. Wilson, John, F.E.T.S., Goodwood, S.A.
1886. *Zietz, A., F.L.S., Assistant Director S.A. Museum, Adelaide, S.A.

ASSOCIATE.

1893. Birks, Laurence, Adelaide, S.A.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT.

The Committee have pleasure in presenting their eleventh annual report, being for the year ending 30th September, 1894.

Evening Meetings.—Eight evening meetings have been held, at which the average attendance was again greater than in the previous year. Owing to the gatherings in connection with the Science Congress in October of last year, the annual conversazione, which is usually held in that month, was omitted. Last winter the meetings of the Field Naturalists' and the Microscopical Sections were held conjointly, but this session, owing to the latter discontinuing to meet, we have not had the advantage of their co-operation. However, the microscopical interest has not been overlooked, as the secretary of that section is now on our Committee, and papers dealing with subjects in microscopy have been read at our meetings. The subjects of the papers read have covered a very wide area in Natural History, such varied topics as birds, stone implements, fishes, pearls, the Antarctic Continent, the Australian Alps, a new rotifer, and the odontophores of gasteropods having been brought before the members. Papers have been contributed by the following gentlemen:—Dr. R. T. Wylde, Messrs. W. Howchin, F.G.S., J. G. O. Tepper, F.L.S., E Ashby, W. H. Selway, jun., W. B. Poole, A. F. Calvert, M.E and J. W. Bussell, F.R.M.S. The exhibits still form an important feature of these meetings, and some very interesting specimens have been shown.

Excursions.—Seven excursions have been held, the attendance at which has been very satisfactory. Nearly all the excursions have been to fresh localities, the most noteworthy being those to Happy Valley, Woodhouse (Stirling East), the River Sturt (from Darlington), and the top of the range from Tea Tree Gully to Anstey's Hill. A dredging trip was arranged for, but not sufficient response was made to justify its being held. At the excursion to Happy Valley the rare orchid, Orthoceras

strictum, was gathered for the first time at these outings, while at the trip to the River Sturt some interesting geological features were noticed, and on the same occasion a group of nests of the Fairy Swallow (Lagenoplastes ariel) was observed.

Corresponding Members.—Your Committee regret that they have not heard much from corresponding members during the year. From the situation of these members in remote places, it is thought that many specimens new to those living in the capital might be obtained, as well as observations on local fauna and flora. Amongst the specimens received from corresponding members, was the very rare locust, Alectoria superba, sent by Mr. W. E. Rumball, of Blinman. A large and interesting collection from another resident in the far north (Mr. J. R. Mack), included some of the "barking" or "whistling" spiders, to which species reference was subsequently made by members of the Horn Expedition to central Australia on their return to Adelaide.

Protection of our Native Fauna and Flora.—A separate report from the Committee appointed for this purpose will shew what has been done in this direction during the past year.

Death of the Rev. J. McEwin.—Your Committee recorded with much regret the death, during the past year of the Rev. J. McEwin, a foundation member of the Section, a member of the Committee, a contributor to its evening meetings, and a frequent attendant at its excursions.

Resignation of the Hon. Treasurer.—Mr. S. Smeaton, B.A., who was appointed the Hon Treasurer of the Section at the last Annual Meeting, resigned that position a few months later owing to his removal to Western Australia; since then his duties have been performed by the Hon. Secretary.

Proceedings.—No proceedings for 1892-3 have yet been printed, it being the attention, chiefly on the ground of economy, to issue two years' transactions together.

Financial.—From the audited statement of accounts presented herewith, it will be seen that the subscriptions more than cover the expenditure. The latter, owing to the conversazione not being held, and the proceedings not being printed, has been lower than for several years past. The call on the parent Society in the way of grants has been correspondingly reduced.

Membership.—There has been several new members enrolled during the year, while a few names have been removed. The number now on the roll is 90.

ROBERT H. PERKS, Chairman.
W. H. SELWAY, JUN., Hon. Secretary.

Adelaide, 18th September, 1894.

SIXTH ANNUAL REPORT OF THE NATIVE FAUNA AND FLORA PROTECTION COMMITTEE.

In presenting their sixth annual report, the Committee have to chronicle a year in which not much of note has taken place.

Game Laws.—The usual steps have been taken to secure the enforcement of the Game Laws, and the Commissioner of Crown Lands and the police officials merit the thanks of the Committee for the action that they have taken. Various pleasing evidences of the fact that the close seasons are much more strictly observed than in former years have come under our notice.

Amendment of the Game Laws.—The Bill drafted by the Committee amending and consolidating the Game Laws passed the Upper House last season, but lapsed in the House of Assembly. It has not seemed to be opportune to the Committee to press for any further alteration in the Game Acts this session.

Reserves.—The Australasian Association for the Advancement of Science have urged the Government to dedicate the lighthouse reserve at the western end of Kangaroo Island for the preservation of native fauna. The Committee consider that for the present the lighthouse keepers should be asked to pay special attention to the protection of indigenous animals in that locality.

In conclusion, the Committee will be pleased at any time to receive suggestions from members as to the best way of achieving their objects.

A. F. Robin, Hon. Sec.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the Year 1893-4.

Dr. Receipts.	£	s.	d.	Cr. Disbursements.	£	s.	d.
To Balance brought forward	4	1	4	By Printing	4	11	0
" Grant from Royal Society	10	0	0	" Postages and Sundries	4	2	6
" Subscriptions	13	10	0	" Advertising	2	11	0
				" Attendance	1	0	0
					12	4	6
				" Subscriptions, as per contra, handed over to Royal Society	13	10	0
				" Balance in hand	1	16	10
	£27	11	4		£27	11	4

Audited and found correct.

THOS. EVANS, F.S.A.I.A.,
THOS. FABIAN, } Auditors.

W. H. SELWAY, Jun.,
Hon. Secretary.

Adelaide, 17th September, 1894.

MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT, 1893-4.

In consequence of the decreasing number of members who took any interest in microscopical work or attended the meetings, a special meeting was called on April 10th to consider the position of the Section, and as to whether the joint meetings with the Field Naturalists' Section should be continued or not. At this meeting there were only four members present, and it was unanimously felt that it was useless to endeavor to continue the existence of the Section. The Secretary therefore, was directed to notify to the Royal Society that the Section was dissolved, and as there would probably be a small balance on hand after payment of all accounts, the Microscopical Magazines on hand were to be bound as far as funds would permit. All property of the Section to be handed over to the Royal Society.

Appended is a statement of receipts and expenditure. After payment of account for binding there would be a balance of 5d. on hand to be paid to the Royal Society.

J. W. Bussell, Hon. Sec.
D. Fleming, Chairman.

MICROSCOPICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

STATEMENT OF RECEIPTS AND EXPENDITURE FOR THE YEAR ENDING 30TH SEPTEMBER, 1894.

RECEIPTS.	£	s.	d.
Balance in hand 30th September, 1893	4	14	5
Subscriptions received	2	0	0
Balance due Secretary	0	4	1
	£6	18	6

EXPENDITURE.	£	s.	d.
E. A. Petherick & Co.—Magazines	1	6	6
Baker & Co.—Objectives for Microscope	3	1	0
Attendance	0	7	6
Stationery	0	0	6
Postage of Circulars, &c.	0	3	0
Royal Society, Subscriptions	2	0	0
	£6	18	6

Audited and found correct.

C. C. PRESGRAVE, Auditor.

September 10, 1894.

D. FLEMING, Chairman.

W. J. BUSSELL, Hon. Secretary.

September 2, 1894.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

SECOND ANNUAL REPORT.

In presenting their annual report the Committee are pleased to record that the objects for which the Society was formed are been carried on satisfactorily.

The Section has 39 members on its roll, having gained five new members and lost five by death and removal since last annual meeting.

The attendance at ordinary meetings has not been so large as the Committee would have liked and expected, the average number present being 15, *i.e.*, less than one-half, after allowing for the six members resident in the country.

One of the ordinary meetings was given up to a conversazione at the Observatory, when, by the courtesy of our President and his staff, a pleasant and profitable evening was spent, including a view of celestial objects by the aid of the equatorial telescope.

The papers read and discussed during the season 1893-4 were :—"Captain Weir's Azimuth Chart," by the inventor; "Ether: The Reasons for Believing in its Existence and its Properties," by Mr. C. C. Farr, B.Sc.; "The Habitability of the Planets," by Mr. W. Holden; "Meteors," by Mr. W. Russell; "Astronomical Photography," by Mr. E. P. Sells; besides which, the passing astronomical phenomena have been expatiated upon by our President, the Government Astronomer (Sir C. Todd), and much valuable information afforded to lay members.

The Astronomical Notes begun in July, 1892, have been continued monthly and distributed to every member, and are, the Committee hopes, found to be increasingly interesting.

The Committee would again ask all members to seek to interest others in the objects of the Section as set forth in Rule 2.

Adopted at meeting held Tuesday, 11th September, 1894.

Wm. Holden, Vice-President.

W. E. Cheesman, Sec. and Treas.

11th September, 1894.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Statement of Receipts and Expenditure for Year ending 15th September, 1894.

Dr.	£	s.	d.
To Balance 8th September, 1893	6	2	9
" Grant from Royal Society	12	0	0
" Subscriptions received	6	2	6
" Interest—Savings Bank	0	5	7
	£24	10	10

Cr.	£	s.	d.
By Printing Monthly Notes	2	8	0
" Stationery	0	9	0
" Postage	2	7	6
" Advertisement and Printing	1	0	10
" Lantern—Sunday-school Union	1	0	0
" Attendance	0	2	6
	7	7	10
" Subscriptions Paid to Royal Society	9	0	0
" Balance in Savings Bank	7	19	3
" " in Hand	0	3	9
	£24	10	10

Audited and found correct.

RICH. F. GRIFFITHS, Auditor.
September 10, 1894.

Submitted to the Annual Meeting, held 11th September, 1894.

WM. HOLDEN, Vice-President.
W. N. CHEESMAN, Hon. Sec. and Treasurer.
September 11, 1894.

GENERAL INDEX.

[The species and genera, the names of which are printed in italics, are described as new.]

Adelium *ellipticum*, 219.
Agonocheila *perplexa*, 201.
Agriophara *cremnopis*, 93.
Anamesia (?) *fulvornata*, 177.
Anoplognathus abnormis, quadrilineatus, 206.
Apolyta aurantia, 172; pellucida, 171; reticulata, 172.
Archiblatta Hoeveni, 185.
Arrhodia *orthotoma*, 83.
Australian Blattariæ, 169; Coleoptera, 139, 200; Heterocera, 77; Rhopalocera, 114.
Bagous *clarenciensis*, 163.
Bednall, W. T., on a new land-shell, 190.
Bembidium striolatum, 139.
Blabophanes *heterogama*, 109.
Blackburn, Rev. T., on Australian Coleoptera, 139, 200.
Blandfordia *Stirlingi*, 196.
Blattariæ of Australia, 169.
Brachypeplus Haagi, 203.
Brachyselidæ, notes on, 75.
Cæsyra *euchrysa*, 99; *heliophanes*, 100; *heterozona*, 100; *ochrochoa*, 101; *opsiphanes*, 100.
Callabonna Lake, osseous clays at, 195.
Callizyga *dispar*, 132.
Candezea *Leai*, 237.
Carpophilus excellens, 203.
Central Australia, land-shells of, 190, 191; sedimentary rocks of, 197.
Cestrinus *angustior*, 211; *aspersus*, 210; *Championi*, 210; *eremicola*, 211; *Zietzi*, 212.
Charopa *æmula*, *retinodes*, 192.
Chewings, Dr., on the sedimentary rocks of Central Australia, 197.
Choleva antipodum, 139.
Chorisoneura pectinata, 186.
Cleodora *meliphanes*, 107.
Coelophora gratiosa, 238; *veranioides*, 239.
Coleoptera, new species of, 139, 200.
Corynophyllus Haroldi, melas, 206.
Crytophaga *cephalochra*, 90; ecclesiastis, 89; epadelpha, 89; lurida, 91; *monoleuca*, 91; *platypedimela*, 90; *stenoleuca*, 89.
Cyclothorax lateralis, 203.
Cydmæa mixta, 158.
Cylas formicarius, turcipennis, 164.
Cyphogastra Macfarlanei, 207.
Cyttalia *Sydneyensis*, 161; *tarsalis*, 160.
Dasyposoma castanea, 187.
Derocalymma contigua, 187.
Dichelia *cosmopis*, 87.
Dichromodes *orthogramma*, 81.
Diplocœlus *Leai*, 204.
Ectroma *parvicolle*, 201.
Emplesis *interioris*, 159.
Enæmia *callianthes*, *pyrochrysa*, 111.
Encosmia *cornuta*, 158.
Eochrois *polydesma*, 94.
Eomystis *acribes*, 135.
Epidesma *thermistis*, 81.
Epilampra pectinata, *Tatei*, 174.
Erirhinini, genera of, 144.
Ethas eruditus, 157; *varians*, 156.
Euchloris *goniota*, 86; *megaloptera*, 87; *microgyna*, 85; *orthodesma*, 86.
Eulechria *cephalochrysa*, 95.
Euphiltra *angustior*, *thermozona*, 137.
Eupselia *holoxantha*, 105.
Eurhynchus bispinosus, *splendidus*, 163.
Eurypelta epiprepes, 135.
Froggart, Mr. W. W., notes on Brachyselidæ, 75.
Gelechia *anthracephala*, 105; *epimela*, 106; *hæmaspila*, 107; *mesochra*, 107; *microspiloplaca*, 106; *nana*, 107; *strophiopeda*, 105.
Geoscapheus *giganteus*, 176; robustus, 175.
Glaucopela *distincta*, 155; *fusco-marmorea*, 155.
Gracilaria *albistriatella*, 129; *albomaculella*, 125; *albospersa*, 121; *aurora*, 127; calicella, 124; *chlorella*, 121; *enchlamyda*, 126; *euglypta*, 122; *eurycnema*, 122; *fluorescens*, 127; *heteropsis*, 112; ida, 126; *irrorata*, 124; *microta*, 128; *nitidula*, 128; *obscurella*, 125; *octopunctata*, 123; *parallela*, 130; plagata, 120; *plebeia*, 131; *polyplaca*, 112; pyrochroma, 129; *trapezoides*, 123; *Tristaniæ*, 130; *unilineata*, 131; *xyloplanes*, 123.
Guestia *peladelpha*, 101.
Hadra *Adcockiana*, 190; *arcigerens*, 193; *clydonigera*, 193; *euzyga*, 194; *grandituberculata*, 193; *oligopleura*, 193; *papillosa*, 194; *setigera*, 194; *squamulosa*, 193; *sublevata*, 192; *Wattii*, 192; *Wilpenensis*, 193; *Winneckeana*, 194.
Haplonyx *ornatipennis*, 164.
Hemibela trispora, 136.
Hepialus *cyanochlora*, 77; *thermistis*, 77.
Heterocera, new Australian, 77.
Hopatrum *Adelaidæ*, 214; *Carpentariæ*, 213; *Cowardense*, 215; *Darlingense*, 216; *Darwini*, 217; longicorne, 217; *Meyricki*, 213; *Victoriæ*, 218.
Hoplitica *eugramma*, 93.
Hydriomena *callizona*, 78.
Hypattalus elegans, 209; *punctulatus*, 208.
Iodis *microgyna*, 85.
Ischnoptera australis, 172; fulva, 172; termitina, 173; triramosa, 173.
Isodon pecuarius, subcornutus, 206.
James Range, sedimentary rocks of, 197.
Lake Callabonna, osseous clays at, 195.

Land-shells from Central Australia, 190, 191.
Lepidotarsa *chryscrythra*, 135; *leucella*, 135.
Leptozosteria *secunda*, 183.
Licinoma *sylvicola*, 219.
Liparus *Spenceri*, 192.
Lithostrotus cœrulescens, 200.
Lower, Mr. O. E., on New Australian Heterocera, 77; and Rhopalocera, 114.
Macdonnell Range, sedimentary rocks of, 197.
Macrobathra *asemanta*, 103; *dasyplaca*, 103; *diplochrysa*, 104; *gonoloma*, 104; *heterocera*, 102; *micropis*, 102.
Macroura Baileyi, 204.
Metaxymorpha *gloriosa*, 207.
Microlepidoptera, descriptions of, 120.
Microvalgus *scutellaris*, 206.
Mimoscopa *opsiphanes*, 110.
Misophrice *dispar*, 161; *quadraticollis*, 163; *spilota*, 162.
Monoctenia *cycnoptera*, 84; *odontias*, 83; *orthodesma*, 84; *xanthastis*, 85.
Moreton Bay, Microlepidoptera from, 120.
Myology of Notoryctes, 3.
Nearcha *didymochroa*, 80.
Notodonta *cycnoptera*, 78.
Notomulciber Carpentariæ, 166.
Notoryctes, myology of, 3; osteology of, 1.
Ocystola *oxyptera*, 101.
Œcophora *pentochra*, 102.
Olanæa *mentitrix*, *metropolitana*, 152.
Omorophius seriatus, 157.
Onychodes *euchrysa*, 82.
Orcus nummularis, 240.
Organic remains of the osseous clays at Lake Callabonna, 195.
Oricopis *guttatus*, 167.
Osseous clays at Lake Callabonna, 195.
Osteology of Notoryctes, 1.
Oxyops *pictipennis*, *placida*, 143.
Palmerstonia *minor*, 139.
Palparia *callimorpha*, 93; *subrosea*, 134.
Panesthia dilatata, Kraussiana, lævicollis, 188.
Paracymus nitidiusculus, 203.
Paranauphoeta rufipes, 189.
Paraphoraspis *castanea*, 173.
Paratemnopteryx australis, 170.
Paropsis *advena*, 230; *affinis*, 229; *angusticollis*, 230; *bella*, 236; *Bovilli*, 231; *cerea*, 228; *colorata*, 232; *convexa*, 235; *debilitata*, 227; *glauca*, 232; *intermedia*, 237; *latissima*, 235; *longicornis*, 228; *montana*, 226; *mutabilis*, 234; *mystica*, 233; *variegata*, 233; *Zietzi*, 236.
Paryzeta *vittata*, 151.
Pedois *neurosticha*, 112.
Peltophora *eugramma*, 98; *holocycla*, 98; panxantha, 98; psammochroa, 97.
Periplaneta flavicincta, 184; glabra, 185.
Philobota *icosceliphora*, 97.
Philonthus sanguinicollis, 203.
Phoracantha *lætabilis*, 165.
Phyllodromia albovittata, 172; bitaeniata, 170; similis, 171.
Piloprepes *lophoptera*, 96.
Pinara *erubescens*, 77.
Planispira *hemiclausa*, 192.
Platyzosteria bifida, 180; *exaspera*, 182; Heydeniana, 180; liturata, 180; melanaria, 179; *picta*, 182; *subzonata*, 181; zonata, 180.
Pleurota *stenodesma*, 99.
Pogonias *capnopa*, 109; *heliodora*, 108; *heliotricha*, 109; *porphyrescens*, 109; *trissodesma*, 108.
Polyzosteria *Frenchii*, 178.
Pupa *Beltiana*, *eremicola*, *ficulnea*, *ischna*, 191.
Rhachiodes *forcipatus*, *strenuus*, 154.
Rhopæa *callabonnensis*, 205.
Rhopalocera, South Australian species of, 114.
Scopæus ruficollis, 203.
Scopodes *flavipes*, 202; *intermedius*, 202; *simplex*, 201.
Scorpiopsis superba, 132.
South Australian Rhopalocera, 114.
Sphyrelata *dichroa*, 95.
Stenogyra *interioris*, 191.
Stigmodera *Caroli*, 141; *oleata*, 142; *pictipes*, 140.
Stilicus ovicollis, 203.
Stirling, Dr. E. C., on the osteology of Notoryctes, 1
Striglina *hyalospila*, 87.
Strongylurus minor, 166.
Succinea *interioris*, 191.
Sybra *Mastersi*, 168.
Symbothinus *nasutus*, 151.
Syzeton abnormis, laetus, 219.
Tachys Brightensis, 139.
Tamnelytra Harpuri, 170.
Tate, R., on new land-shells, 191; organic remains of the osseous clays at Lake Callabonna, 195; on the occurrence of Zidora in Australian waters, 118.
Telecrates *heliomacula*, 92.
Temnoplectron *diversicolle*, 204.
Temnopteryx Couloniana, obscura, 170.
Tepper, Mr. J. G. O., on the Blattariæ of Australia, 169.
Themelia inconspicua, 159.
Trachypepla *callidesma*, 96.
Tritymba *dasybathra*, 110; *xanthocoma*, 110.
Turner, Dr. A. J., descriptions of Microlepidoptera, 120.
Uloma depressa, consentanea, 219.
Uzucha *hypoxantha*, 88.
Wilson, Prof. J. T., on the myology of Notoryctes, 3.
Xantheros nubicollis, 208.
Xanthorhoe *pelochroa*, 80; *platydesma*, 79.
Xeda *magistra*, *notabilis*, 153.
Xenomusa *tetramera*, 82.
Xylorycta epigramma, 91; *homoleuca*, 91; porphyrinella, 91; *sigmophora*, 92.
Zeitzia geologa, 206.
Zidora *Legrandi*, 118.
Zonopetala *zygophora*, 95.

Vardon & Pritchard, Printers, Gresham Street, Adelaide.

TRANSACTIONS

OF THE

ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XIX., for 1894-95.

[With Ten Plates.]

INCLUDING PROCEEDINGS AND REPORTS.

EDITED BY PROFESSOR RALPH TATE.

ISSUED DECEMBER, 1895.

Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

Parcels for transmission to the Royal Society of South Australia, from Europe and America, should be addressed "per W. C. Rigby, care Messrs. Thos. Meadows & Co., 35, Milk Street, Cheapside, London."

Royal Society of South Australia.

Patron:

HER MAJESTY THE QUEEN.

OFFICERS.

[Elected October 1, 1895.]

President:

WALTER HOWCHIN, F.G.S.

Vice-Presidents:

REV. THOS. BLACKBURN, B.A.

PROFESSOR R. TATE (Representative Governor).

Hon. Treasurer:

WALTER RUTT, C.E.

Hon. Secretaries:

W. L. CLELAND, M.B. | W. B. POOLE.

Members of Council:

SAMUEL DIXON.
WALTER HOWCHIN, F.G.S.
J. S. LLOYD.
PROFESSOR E. H. RENNIE D.Sc., F.C.S.
W. H. SELWAY, JUN.
E. C. STIRLING, M.D., M.A., C.M.G., F.R.S.

CONTENTS.

PART I. (Issued July, 1895.) PAGE.

PARKHOUSE, T. A. : Native Tongues in the Neighbourhood of Port Darwin 1

TEPPER, J. G. O. : New or Little-known Orthoptera from Lake Callabonna 19

GOYDER, G. A. : Reactions of Double Cyanide, bearing upon the Cyanide-process for Gold-extraction 25

BLACKBURN, REV. T. : Description of New Genera and Species of Australian Coleoptera (XVII.) 27

HOWCHIN, W. : New Facts bearing on the Glacial Features of Hallett's Cove 61

MOULDEN, J. C. : Petrographical Observations on some South Australian Rocks 70

TATE, PROF. R. : A Supplement to a Census of the Flora of Extra-tropical South Australia 79

VERCO, DR. J. C. : Descriptions of New Species of Marine Mollusca of South Australia (Plates 1-3) 84

VERCO, DR. J. C. : A Revision of the Recent Gasteropods of South Australia (i.) 94

TATE, PROF. R., and DENNANT, J. : Correlation of the Marine Tertiaries of Australia, Part II., Victoria *(continued)* 108

PART II. (Issued December, 1895.)

DAHL, KNUT : Treatment after Circumcision in the Daly River Tribe, Northern Territory 122

SLOANE, THOMAS G. : Notes on Carabidæ from Lake Callabonna, Central Australia 124

ETHERIDGE, R., JUN. : Additional Plant Remains from the Leigh Creek Coalfield, Central Australia (Plates 4-6) 138

TEPPER, J. G. O. : Notes on Victorian and other Blattariæ, and Descriptions of New Species 146

SMITH, DR. G. ELLIOT : The Comparative Anatomy of the Cerebrum of *Notoryctes typhlops* (Plates 7-9) 167

HOWCHIN, WALTER : Carboniferous Foraminifera of Western Australia, with Descriptions of New Species (Plate 10) 194

HOWCHIN, WALTER : Two New Species of Cretaceous Foraminifera (Plate 10, pars.) 198

BLACKBURN, REV. T. : Description of New Genera and Species of Australian Coleoptera (XVIII.) 201

PAGE.

Abstract of Proceedings 259

Annual Report and Balance-sheet 264

Presidential Address 266

Donations to the Library 279

List of Fellows 286

APPENDICES.

Proceedings, Annual Report, and Balance-sheet of the Field Naturalists' Section 289

Proceedings, Annual Report, and Balance-sheet of the Astronomical Section 292

Proceedings, Annual Report, and Balance-sheet of the Malacological Section 294

Remarks on the Native Tongues in the Neighborhood of Port Darwin.

By T. A. Parkhouse, formerly Accountant and Paymaster S.A. Railways, Port Darwin.

[Read November 6, 1894.]

The aborigines in whose country Port Darwin is situate are the Lárraki'a, of whom Mr. Paul Foelsche has given some interesting particulars in a previous paper.* They inhabit a tract of land embracing the seaboard from Shoal Bay to Southport, together with some portion of the country west of that port. At the forty-six mile on the railway line we pass their southern border, and going through a neutral belt of some eight or ten miles, strictly preserved and upon which none trespass without good reason, at near Rum Jungle enter into the territory of the Awárra, whose southern boundary is the Howley. At about Fountain Head commences the country of the Aggrakúndi, extending to the Union and perhaps to near Pine Creek. Beyond Pine Creek to the Katharine are the Adówen (?) and Mennagi (?). To the east of the Lárraki'a, from Marrakai cattle station on the Adelaide River to Shoal Bay and thence along the seaboard to beyond Escape Cliffs, are the Wúlnar; and east of these again and abutting on the Aggrakúndi are the Mary River (? Berigurruk) and Alligator River tribes, the country of the latter extending south as far as the Eveleen.

These districts are subdivided among the several families of the tribes. I am of opinion that each family has its own proper name, but I have no evidence that this is the case; nor do I find totems, or that there is any restriction as to food. The laws governing marriage, too, remain to be discovered; I have little information except that in certain instances, where the individuals were pointed out, *a* would have been the wife of *b* had *a* been born a girl, or *b* the wife of *c* were *b* female A Lárraki'a stated, in the first instance, that the issue was from a common forefather, *b* being descended in male line from one wife, and *a* descended in female line (until *a*) from another wife. These cases may simply mean that the parents arranged a marriage before the birth of the infants, sex being favorable.

These natives are tall, well-set, and of an excellent carriage. They are clean-limbed and with little hair on the face, thus differing from the race south of the MacDonnell Ranges, to

* Transactions Roy. Soc. S.A., vol. V., 1881-2.

whom they are superior, not only in stature and symmetry, but, generally speaking, in feature likewise. The aborigines of the Alligator and Mary River tribes, which possess similar characteristics and will probably be found to be in alliance, are the finest in physique and apparently the most numerous. They are feared by the other tribes, whom they hold in small esteem. A party of the former tribe every year or two make their way to Port Darwin, but they are not welcome visitors and the Lárraki'as breathe more freely when their five or six weeks' sojourn is at an end. At Burrundi, where a camp is formed by some of them nearly every year, the Aggrakúndi vacate the place entirely at their approach. Their speech is fuller, deeper, and more resonant than that of the others, and I regret that I am unable to give examples—"kwaokh-dong-'aok" (fire), Alligator River, is the only word I have noted.

Second to these physically are the Wúlnar and Lárraki'a, allied tribes between whom intermarriages are frequent; some families of the Wúlnar, indeed, have a permanent camp at Port Darwin. In the speech of the Wúlnar a pretty intonation is observable, not used by the other tribes, but which Mr. Joseph Bradshaw tells me he found in a tribe in the north of Western Australia. The cadence is especially noticeable in the conversation of the girls and younger women, but, curiously enough, I have not heard it adopted by a Lárraki'a conversing in Wúlnar, nor is it used by a Wúlnar speaking Lárraki'a. For example, "enough" is in Lárraki'a "bánuk," and in Wúlnar "bi-léi-ya;" or, while a Lárraki'a calls a mosquito "lámtda," an Awárra says "nael," and an Aggrakúndi "kimmiel," the Wúlnar chants "mung-or-ung-er-er." So also in "unggoingi," the first syllable "ung-" is said in an even tone, there is a fall upon "-go" gliding into "in-," and a rise for the final syllable "-gi."

Inferior to the Lárraki'a and fewer in numbers are the Awárra and Aggrakúndi, who again are allied tribes; indeed they have been hitherto known to Europeans only as Wulwóngga, and a member of either tribe will so designate himself. The Aggrakúndi, it is said, were formerly more powerful and in alliance with a tribe called Awinmül, whose head camp was at Burrundi, but the mortality of one bad season so reduced the numbers of both tribes, and especially of the Awinmül, that they became one.

There is no dialect common to any of these tribes in addition to the tribal tongue, as in some parts of Queensland. A Lárraki'a can hold no converse with a Wúlnar unless one has learnt the language of the other, nor an Awárra with an Aggrakúndi except he be bi-lingual. The construction of the language, however, is the same throughout, the difference being merely in

the words used, and its simplicity is well exemplified in the examples given at the foot of each page in the vocabulary annexed.

The Lárraki'a verb is often in some moods and tenses rendered by the same form, as "mogwiri," you two go, or may we two go, or will we two go. Thus "ngigāri mogwíri," where the variation except for euphony is only in the pronominal prefixes "ngi-" and "mo-," meant "you go on (ngigāri), we two will come after (mogwiri);" "bágbirra mogwíri banmogwínma" was a question in which one of two boys asked whether they might carry my bag; "brédema mógwiri baimítum," spoken to their fellows at another time, explained that the speaker and another lad were on the way to buy bread. The indicative future-simple and the perfect are rendered: as "neggellipmerk," you will return, "neggellipmenerk," you have returned. The imperative, "give me," is "an-ngok," and "I am about to have given to me" is "annagok;" as, "erribókwa ánngok," give me a light, "tobákkwa ánnagok," he is going to give me tobacco presently; "nágok," I give to you, "mínnannagok," he will give to you and me. "Ngigíddjyi" tells one to arise; "neggogiddjyi" enquires whether you are getting up or asserts the fact.

Thus, "dallipmenérk dállípbing" indicates in *da-* the third person plural, *-alip-* is the root, *-me-* the perfect tense, *-merk* the direction towards and not from; while *-bing* in the second word denotes the continuance of their absence, the meaning being, "They have come back and cleared out"—broken up camp, gone away not to return. So in "dállípbing dálaji," they have cleared out and gone away. While, as in "ngigári" in the example given above, "go" is "-gāri," "gone" is represented by *-laji*, and for "been gone" *ára* is prefixed; as "bíláji," he is gone, "bárabiláji," he has been gone. As "-merik" indicates the direction towards, so *-um* signifies "from"—"nógólderk," for instance, run to me, "nógoldum," run from me.

In nouns I find no variation in declension for number, person, or case.

The Lárraki'a personal and possessive pronouns are—

Separable.	Inseparable.	Separable.
ánannga	an-, I, me	ánagi, mine
ámille*	— I myself	ànang-emìlla, belongs to me
ít'úma	ngi- *or* ne-, you	it'ennagi, yours [myself
yába	bi-, he, she, it, him, her	biánnagi, his, &c.
bimilla	— himself, &c.	
dorendbirra	— we, us	dorennagi, ours
moanmi*ll*a	mo-, you and I, he and I	moánnage, belongs to us two
biddendbira	do- or da-, they, these	biddennági, them

* -muella (German ü) is a term of emphasis, as "patj'i," he is good; "patch'imilla," he is good fellow, *i.e.*, very good.

to which must be added the inseparable "go-," this fellow, "kwond-," those fellows, and "gonbodénnagi," belongs to this or those fellows.

I have not learnt an inseparable first person plural as distinct from the third, or any second person plural. "Ngigári" (be off with you), for instance, was used in addressing several or one; Father Konrath has, however, "gurangura," you, and "gurenn-ege," yours (pl.).

One notes in the Lárraki'a first person singular "ananga" the similarity to the Hebrew "anoki" and the Moabite "anak;" followed in Wúlnar by "tanúnga" and in Awárra by "ngiak," but lost altogether in the Aggrakúndi "arraman." The first person singular "a-" and "go-" and the dual "mo-" or *mau-* compare with the Polynesian,* and the third person "yá-ba" with *ia*. The occurrence of "it'uma" as a pronoun of the second person in Larraki'a and of *ituma* (ye) in Oceanic is scarcely fortuitous.

So, too, the New Zealand, Samoa, and Hawaii *la* compares with the Lárraki'a "làllira" and Awárra "miral" (sun); Samoa *lalanga* (to broil), and the Polynesian *lani*, *langi* (day), with Lárraki'a "illángwa" (day); Tonga *lo-nguto* (the lips) with Wúlnar "lúngitperner" (the jaw); Samoa *alanga* (to shout), Lárraki'a "aléngea" (to growl, as at an interloper); Polynesian *io*, Awárra "yo," Lárraki'a "g'o" (yes); Hawaii and Tahiti *waha*, Rarot. and Mangar *waa* (talk, gossip), with Wúlnar "weyer" (talk), "waoba" (mouth), "waoler" (laughing), "waol" (ear); Polynesian *wai* (fresh drinking water), *wai-u* (milk, *lit.* breast-water), North Celebes *aki*, *akei*, with Wúlnar "aeke" (water), Lárraki'a "kwiumung-gaoppowei" (milk);† Ceram (Gah.) *arr*, Palaos Islands *arrall*,‡ Lárraki'a "kwarroa" (water); Palaos *tut*, Awárra "dutut" (milk); Bougainville Islands *kala*,‖ Lárraki'a "kallaguk" (one).

---

* See Fornander, "Polynesian Race," page 24.

† Father Konrath had "gumungappa" and "quiumungappa," Mr. P. Foelsche "gunnimkappa," and I had written "kwiumunngappa." My boy, however, told me, "That one no proper. You say all same black-fellow—kwí-u-múnng-gáop-powei," a correction I verified when more familiar with the tongue. Although not in use by the Larraki'a, *abba*, *kappa*, &c., are common aboriginal terms for water, and, in association with *amung*, the idiom breast-water is preserved. This link of the Polynesian *wai*, and the *auwei* (water) of South Australian tribes, with the *kappa* of other tribes, although of little value apart from evidence bearing upon the origin of *gaop* is not without interest. The Wúlnar *aeke* and Awárra *wik*, it will be observed, point to wéi k...?... with an apocope, and the Larraki'a *kwaorrowa* to kwo arra wai.

‡ Wilson, "An Account of the Pelew Islands."

‖ Guppy, "Solomon Islands and their Natives."

Many of the words used by the Port Darwin aboriginals recur among far distant Australian tribes—the Lárraki'a and Wúlnar "kap" (be silent) in the *kapo* of the Marowra at the junction of the Murray and Darling Rivers;* "banbanning," Larr., and "illebidbanna," Wúl. (I do not know, *lit.* see), in *illa bano nato*, Mar. (I did not hear); "bunbano," Larr. (women with children), in *kumbunbano*, Mar. (any number of women); "anngoka," Larr., *ngoka*, Mar. (give me), again reproduced in the *nooka* of the Cornu.

Among the Narrinyeri of Encounter Bay *lakkin* (throwing a spear) compares with "laggin," Awárra (throwing away); *yakkai* (ah! oh!), Narr. and Larr.; the Narrinyeri *ngan*, Marowra *ngana*, the *nanni* of the Diyeri of Lake Eyre, *nganno* of the Lake Kopperámano aboriginals, and the Lárriki'a "anannga" (I, me). Again, the Lárraki'a "náow'á" is repeated in the Diyeri *noa* (husband); and "bolinyi" is not lost in the Diyeri *palina* (dead), and, further modified, is traceable in the *palone* of Yardea and *piallano* of Venus Bay.

In eastern Australia we find the Awárra "yo" (yes) in Kamilaroi;† the Awàrra "yan" (come, go) at Georges River, Botany Bay, in the *yannin* of the Dippil tribe at Moreton Bay, and the *yennan* of the Turrubul on the Brisbane River, and it is repeated at Lake Amadeus, Central Australia (*yan*, walk.);‡ the Lárraki'a "gínnyi" (sit), Dippil *ninnai*, Turrubul *nginnen*, and the *nginne* of the Pikumbul tribe at Calandoon in Queensland; Lárraki'a "kwi-amung-gaoppowei" and Dippil *amung* (breast).

As noted by the Rev. W. Ridley, M.A., of Sydney, with respect to the Kamilaroi, so the Lárraki'a gives intensity to any expression of thought or feeling by prolonging the last or the root syllable. Thus the longer yaokkei-i-i is held the greater the expression of wonder or sorrow, the longer the *ai* in "argai" the more intense the pain or the greater the weariness, while in dirriwa he dwells on *dirrr* to magnify the distance.

In Western Australia the Awárra appellation for the moon reappears among the Pidong of the Murchison River and the Wallawe of Yarrgabie Station as the name of the sun ("karrong," *karong*, *kurrung*), the Awárra "yan" (come) in *yannma* (go), *yann*, *yannaji* (come), and the Lárraki'a "negínnyi" in *nginna* (sit); the Lárraki'a "g'o" in Pidong *ngow* or *kwa* and Wallawe *kua* (yes); Lárraki'a and Pidong "yokkai" (oh!). In the *puddja* of the Minninng tribe of the Fraser Range is found the Lárraki'a "paddji" (good), and the Awárra "aliddma" (teeth) in

* Holden, "South Australian Folklore," edited by the Rev. G. Taplin.

* Ridley, "Kamilaroi and Other Australian Languages."

† W. H. Willshire, "Aborigines of Central Australia."

the Minninng *thalidd.** Here, too, it is to be observed one word as in Lárraki'a, expresses both eating and drinking.

The same expression "sitting down" for residing or abiding with is observable in the Lárraki'a of the north, the Narrinyeri of South Australia, and among the aborigines on the eastern coast of New South Wales; and I doubt not such other idioms as "Me been lose 'em; by-and-bye me find 'em" (I forgot it; I shall remember presently), "Him bite me" (a thorn prick), "all about" (many), "Water sit down" (a pool of water is there), "What name?" (what is it? what am I to do?) are equally widespread. Idiomatic turns of expression deserve more attention than they receive, and they should be recorded word for word both in the native tongue and in the blackfellow's interpretation in English.

In concluding my paper, I wish to express my thanks to the Rev. Father O'Brien, S.J., of the Northern Territory Mission, for much valuable information concerning the Lárraki'a.

ORTHOGRAPHY.

a, as a in father; *ā*, as in mate; for a in mat, double the consonant, as matt, fann.

i for ee in esteem and for y in any; also frequently for *ue* in German muede; for i in kitchen double the consonant, as kittchen.

ei for ey in they
e " e " met
ai " i " ice
oi " oy " boy
au " ow " now
ao " ao " Macao, and aw in fawn
u " oo " fool, u in full
kw " qu " queen
g, as in gun; *j* for g in gin
dj for dg in dudgeon; *jj* for dge in judge
kh, guttural only
The aspirate is represented by the sign (').

Letters in italics are frequently elided or only indicated.

NOTE.—The aspirate is often associated with the sound of *y*, as in Lárrakiy'a, ity'uma, padjy'i, &c.; although much importance is attached to it, on account of its redundancy and following the usual custom I have omitted it except in a few words. The letters *f* and *v* appear, but the former is rather *pf* or *bf*, and the latter partook of a *y* quality. The *r* final in the Wúlna*r* is usually a reproduction of the Cockney final, represented by r' in Glossic, rather than an r. To a European ear *dl* is usually heard as *l*, rarely as *d*; but the Lárraki'a is less concerned at the omission of *l* if the *d* sound is retained; *r* is often mistaken for *l*.

* Lindsay's "Journal of the Elder Scientific Exploring Expedition, 1891-2"—vocabularies by L. A. Wells.

VOCABULARIES.

LARRAKI'A.

Afternoon (sun go down), kwillin-nowa
adulterer (suspicious character),[1] b'umatium
ah! oh![2] yákkei
all, many, binolka, gonyolka
alligator, gumáondera
alone, 'uludbing; all by myself[3], alludjimílla
altogether (entirely), gwílling
always, bálmok
anger, kwiuroa; a bad-tempered man, kwiuronámbirra
angry—I am, you are, ana-, na--múrring
animal, mámmillbirra
another,[4] gállagawírra
ant (little common), dímmirrínda
apron (male's fringe), l'óiyera
arm, kwíaverndára
armlet, mérákkma
ashes, white, daddag'útida; charred, gwíanunóroa
attend, listen, ínna
Baby, dúlda, dórre
back, the, gúmuleng
bad (no good *and* sick)—he is, this fellow is, bó-, gó- -'árra
bag, dáudiwa
bald (forehead big), múdbirma gwíllāga
bamboo, gwíerikgwa
bamboo trumpet, mammíllima
bandicoot, kwárrabálla
banian tree, kólonamírma
beats, he, bínyom; one who beats, bínyombirra
before, in front, mólgoroa; one preceding, molgoroamilla
behind, last,[5] írimmkoa
belly, m'údloma; full, neddlabok; empty, góllomang
belongs to me, him, this or these fellows, án-, bía-, gonboden--nage; to me myself, ánang-amille
belt (hair), br'úræelma
between, *or* the middle one, balall
big, gwíllāge, gwíllagwang
bird, mudjira
bite, 'ándowei[6]
black (*see* dark), binyumínnkoe, k'uminnkoe
blackfellow (s. and pl.), bíliwira
blind (night person), dlāmon-ngapinga
blood, dumáttilla
blunt, kwíunn-gúllpup
bone, nímirringwa
book (*see* marks), mendírrema
box, boat, steamer, mérrima
boy, little, nimm; big, nimmgolólo; children, nímmba
breast, man's, dáramóldera; woman's (*also* milk), kwíumunggáoppowei
broken—it is, this fellow is,[2] báu*kh*-, kwáu*kh*- -ton*g*
brother, elder, néddla; younger, now'ok; my brother, nállanbirra;

1. "What for you come along my camp—you go away? What for you come?" *See* Growl.
2. *Yak*kei bíg'um—"He calls out."
"*Heigh,*" *he says.*
3. Kwó-ngiderrkwa 'ulúdbing kwodlágwa—"I was alone at camp yesterday."
camp alone yesterday.
4. Gwínnbirra gállaga biddla—"This one who is standing by is another blackfellow—not
This another stays.
the same one."
5. Yogolak írimmkoa—"It is behind, somewhere on that side;" N'irimmgwa gwaiyinga
That side behind.
—"I have left it behind."
6. Kwótkita 'ándowei—"The opossum has bitten me."
Opossum me bite.

bring, gwínnakerk, gwín ngírik; he brings, béggigerk; dual bring,[1] méjerk; bring it, I cannot, gollopolla; brought him, bédjikinnerk

1. Kwarroa gwin-ngírik—"Fetch some water;" Ngigári gwinna—"You go and bring it;"
Water here you carry. *You go carry.*
Bún-ngilla (*or* bonári) áragwa bonáni bedjikinnerk—"Which way have you brought
Little girl, (or *fatherless boy*) *where carry him brought.*
the little girl (*or* fatherless boy) you carry with you?" Ngigari máramar gwinnikerk—"Get
You go knife here you carry.
me a knife."
2. Kwiarrimba baotong—"I nearly broke my hand."
Hand part it is broken.

two brothers or sisters, biníppinapp
bush, the, mólngoroa
by-and-by, mánnagwa
Calf of leg, mórna
camp, kwó-ngiderkwa
carry, bonáni; carry this fellow, gabáon; dual carry it,[3] mogwínnma
carry as children are carried—with a hand between legs, bíáttbirra bórrjin; seated on shoulders, anamínnkera; pickaback, anamíddluk
catch it, g'árri; the down-come-fellow, gudlpin-ga; the falling, bíddlabong
children, nímmbirra
chin, gónn-g'onn-gwa
clean, white,[4] 'arkhngarr
clothing, dumúiya
club, sharp-edged, mommbellégema; round, gwunda
cockatoo, white, arkhngarrwa; black, bíllillílwárwa; tail feathers of black, medémimma
cold—I am, this fellow is, ab-, go--buldópwei; it is cold, dúbbooppwei
come! ngúllakk; come to me, núlligan; I, he comes on,[5] á-, nég--garik
come, he will,[7] néggojakk
come back—I, thou, dual, these fellows,[6] á-, ne-, mo-, kwónd--gellippmérik
come back—dual have, they have,[8] mo-, da- -líppmenerk
coming,[9] barakerk
come down, nogúdmilla; am come down again,[10] gúdmilippmerk
come in (*see* inside), negódyerk
come out, they are, dallippmerk; they have cleared out not to return, dallipbing

3. Bágbirra mogwíri banmogwínnma—"May we two go and carry the bag;" Mogwíri
Bag two go ? two carry. *two go*
bágbirra minnmogwinnma—"We two will go and carry the bag on shoulder."
bag shoulder two carry.
4. Arkhngarr bínoa—"Make it clean."
Clean it make.
5. Nimm ngúllak—"Here, boy;" Néggarik mánnagwa—"He will come on by-and-
Boy you come. *To you come on by-and-bye.*
bye."
6. Argwigam néggellippmerk kwondallippmérk—"When do you return? These are
When you come back? These fellows are come back.
come back."
7. Adnlamille neggojakk—"Which way will he come?"
What name come?
8. Dallippmenérk dallipbing—"They have come back, and then cleared out
They have come back; they are come out.
(broken up camp)."
9. Jeinaminbira bárakerk—"A Chinaman is coming;" Aragwa bárakerk bílira—"Which
Chinaman coming. *Where coming blackfellows?*
way are blackfellows coming?" Birámm barakerk—"All of them are coming on."
All about coming on.
10. Also, *leaning against*, as placing a ladder; thus, gudlamárami is to stand one thing against another, or as one resting his back against a post; Biddla dárwin-ng'idung
Him hit, head hide
gomúlwa gud'arging—"He hit him on his buttocks, his head going down," making the
buttocks come down.
figure Λ "gud."

cook it, gogórapp, gawápp; I have cooked it, ananng-a gurbáoni
copulation, beddijim; he, this fellow, dual copulate or purpose, bengída, kwin-ngída, mogodijji
cough, mámanndíllima
country, béinigerrkgwa
cousin (? actual kinship), némabor
cover me over, menéitchura
crocodile, ann-gállaba
crooked, gurnamadíng-a
cry—I, he, al-, bil--lum; crying bitterly, gwílāgeru bíllum
cut, a, mákkamille
cuts (cicatrices), mammétma
Dark, dlamaongwa; too dark, kumínngoemilli
daughter, allmerk; daughter's husband, noaddjak
day, to-day, now, illángwa

1. Arip gogomille—"How far do I cut (into a water-melon)?"
Into this fellow cut.

dead, báotokk
deaf ("no more him hear"), kwaélla b'uéll*y*idong
devil, biráuel
die (*see* ill)—I, he will, they, a-, bo-, da- -línnyi
difficult (*see* strong), dánkal
dirty, gómúntchül*a*
dog, little, b'illínnga; big, mámorol; wild (dingo), bánnamínngora
door, miáldama
dream, gúlwao niyáni
drink[2] (*see* eat), gógwe
duck, black, kurimínnbirra
Ear, banárro
eat,[3] gógwe, gomogwe; eating—dual are, they are, minnyi, danyi; eaten—he has, this fellow has, they have, bid-, gar-, dad- -biénni
edge (of a knife—*see* teeth), dlennbérrgkwe
egg, gwiámmgwa
elbow, bórumba
embrace (short quick hugs), bóganār
empty, kw'aotídong; make empty, dākw'aot
emu, langwirra
enough, bánuk
excrement, múnmar
eye, lemúrra
eyelash, madobirma
Face, dárreminndbirra
fallen—thou, he, this fellow has,[4] no-, ber-, go- -áddbin*g*
father, nígan; child addressing, nággeding;[5] my father, nígannbirra; father's brother, bípi
fight—I, he, á-, bér- -ramellíddyi*m*
find it, genyúrup; found (*see* catch), gar*i*
finger, gw'íarr*w*oa
finished, bánuk gwílling
fire, gwíannng*w*oa; fire gone out, gwíawínng
firesticks to produce fire, bóllbilli; to use them, wíllam gíllam
fish, múddo*w*a
flesh, búddloa
food, mauma, meiyoma
fool, you, and other terms of vituperation, dinndidáni, dinndáijik, diamy'udáijik

2. Kwárro*w*a mógwe—"This fellow wants a drink of water;" *also*, Golmorra gwinnyi—
Water eat. *Grog sit down.*
"Will this fellow drink his grog?"
3. Banana mogwe—"May I eat the bananas?" Bréddema daddbiénni—"They have
Banana eat. *Bread they have eaten.*
eaten my bread."
4. Agoldum áddbin*g*—"I ran and fell;" Nogoldum *no*addbing—"You ran and fell;"
I ran from fallen. *You ran from fallen.*
Bilá*j*i ber*á*ddbing—"He has gone and has fallen;" Biddla bérraddbing—"He is
He has gone, him fallen. *Him hit, him fallen.*
hit and has fallen."
5. Term of endearment, as when an English child throws its arms around its father's neck, and says, "My daddy."

fool, to, *i.e.*, you fool me, nóligum; you lie to me, gonólum gwínnyíram
foot, gwiéllk*w*a
footprint, biralpbirra
forehead, mudpirrma
forget—I, dual, ál-, mú- -lerrinn-ga; I forgot,[1] kwaélla bí*r*w'a
four, gállatíllik ánndillik
fresh (water), kunúltoa
frightened, be'ud*kh*yéllming
frog, kúlpúlwa
from, -um
full (from eating), néddlabokk, yunútpi
further,[2] dono*er*kwi
Get up—you, he, ngi-, bi- -gidjyi; you are getting up (*see* stand), neggogiddyi
get it, néggildum; I have not got it or brought it (*see* catch),[3] *kw*aella gaora
girl, big, báon-ngugolo; little, báonngilla
give to me, to him, án-, bín- -ngok; you give,[4] nagok

1. "No more catch him."
2. Donoerkwi ngigari—"Go on further."
Further you go.
3. Kwárroa gárri—"Get water."
Water catch.
4. Kwárrowa an-ngok—"Give me water;" An-ngagok tobákkwa—"I am about to
Water give. *Me about to be given tobacco.*
have tobacco given me;" It'uma an-ngok ana—"You give yours for mine.'
You give to me I.

given to me, you, dual, him—about to be, án-, ná-, mínn-, b'u- -ngagok
give, I will not, bárbium
go—I, you, he, a-, ngi-, bi- -gárí; dual,[5] mogwíri; this fellow go, not to return, goaribing
going or coming,[6] néggarikk
gone—he, they have, bi-, da- -láji; he has been gone,[7] bárabiláji
go back—I, you, he, a-, ni-, bi- -géllibum
go round (also *turn*, as a doorknob), gwindari
good, padj'i; very good, pátch'imilla; goodbye, mámáok
goose, bónnamorra; pigmy goose, lidúnnda
grass, small, meriedlema; tall, máotdlema
greedy, múnnowel
ground, gwialwa
growl, to (*see* adulterer), alennjia, allennjiak
Hair of head, br'úridl*wirra*; of face, kwíabálma; of body, m'áuerma; of abdomen, g'áulma
half, kwéawirra
hand, gw'íarr*wirra*
hasten, gwíllipbikk
he, she, it, him, her, yába; his, hers, biánnage; himself, &c., bimilla
head,[8] mállóma
hear—I, he, al-, ba- -leitong
heavy,[9] m'útki
here, yenn, yénngwa
hill, little, gúmaróka gúlla; big, gólogo gwíllāga

5. Anannga it'uma mogwíri—"I and you go;" Ngigári mogwíri—"You go first, we two go after;" Agári bigíddjya bigári—"I will go, let him get up and go away;" ananng-a agari m'ulitúdma muleríppma; agári agalímbgwa——"May I go to the little house, for micturition?" Ngigári big'umm—"Go quickly."
I you two go. You go, two go. I go, him get up, him go. I go little little house; I go I urinate. You go, it is being said.

6. Néggarikk mánnagwa—"He (who has fallen behind) will come on by-and-bye;" Aragwa néggarikk—"Where are you going?" Adnlamilla Máell nèggarikk—"Where is Máell going (having departed)?"
You go towards by-and-bye. Where you go? What name Maell go.

7. Dállippbing daláji—"They have cleared out, and gone away;" Gállatíllikk maramárillikk—"Two have gone away;" Dagárillikk daragwilling—"All have gone away together;" Aragwa moléji—"Which way did we two go?" Arak*wa* bíláji bilira—"Which way have the blackfellows gone?"
They are come out, they are gone. Two two have gone. They are gone, they have been entirely. Where two gone? Where him gone blackfellows?

8. Malloma gwillika—"A big head."
Head big.

9. M'utma m'ulit'udma—"A little heavy."
Heavy little.

hit, shot (*see* stop), bíddla
hold him, duppinnyer
horse, nánntoa
hot—I, you, it is, á-, né-, bér- -rakwírra
how much, argugwínnikk
house, small, ménelürra, m'úleribbma; large, kwónamínngwoa; hut or wurley, máldurébbma
hungry, amúnnding, nigar amúnnding
hurt, are you (*see* ill), nelínnikk; have I hurt you, nawaum
husband, naow'a
I, me, ánanng-a; belongs to me, ánagi; myself, anang-amilla
iguana, kurara
ill, hurt, dying, allínyima; I, you he, they are, a-, ne-, bo-, da- -línyi
inside—you put, this fellow put,[1] no-, go- -gáodta
intestines, namannam*a*nerk
Jabiru bird, dáolduba
jump on back, baramúnnyin
Kangaroo, l'un-ngútpa
kills, hurts, wounds — he, this fellow, they,[2] bi-, go-, da- -gílla
knife, máramári

1. Place in a room or put yourself inside, as, Trautherwa nogoadta—"Put on your trousers."
Trousers you put inside.

2. Bigil*la* nimmgolólo—"He is beating the lad;" Lárraba bigílla—"He has wounded the old man."
He kills big boy. Old man he kills.

know, I (*see* hear), álleitong; I do not know (*see* see), banbaoning, banmaoning
Laugh—I, you, this fellow, they, a-, nel-, gwi*a*l-, dal- -lamáoggi; a big mocking laugh,[3] bókkung gwíllāgi
laughing-jackass bird, l'ánurba
lazy,[4] múmo-ing
leg, dáonda
let me, him (allow), an-, bin- -ngolda
lie down, I, anannga nakkgaert
liar, kwinnyiram
lift it, bíddbíddla; lift this fellow (*see* stand), g'ógíddla
light of day, lallirirkgwa; of fire, bokulktji; light it,[5] bokwínnida
lightning, leaurba
like, relish, bidjalippmerk; distasteful, dúkkwa
like, affection (*see* hear), b'udbaléitmaong; I like you, you like me, al-, nel- -léitmung
like, similar, nog*w*um
listen, inna
little, m'ülit'il, mūlāge, m'ülitudma; little fellow,[6] gúmilla
lives, he, bimedip
lizard, small light, kumúngwa; small darker, lurabella; frill, dáddlwirra
long ago, kwillimigérrgwa, ? allokwa, ? aragwegum
long way, a, dírriwa
look out! (*see* see), gwin-gánna
louse, lamilla
Make, modlum; this fellow make it, gaodlum; I can make it,[7] ana maotbudbing; make it right or proper,[8] agg'aganmidjing

3. Anal*la* gwíallamuggi—"What do you laugh for?"
What for laugh.
4. Illangwa múmo-ing—"He is too lazy now."
Now lazy.
5. Erribókwa an-ngok—"Give me a light."
Light give me.
6. Nímmbirra m'úlit'údma—"Very little children."
Children small.
7. Káppbirra bimódlum—"Is he to make me a cap?"
Cap him make.
8. Trautherwa ag'agannmídjing—"Make my trousers right" (tighten them at the waist). *Trousers me make right.*

mankind, biába, birok
man, young, bállia; married, móllinyu; old, lárriba
many, binnólka, birammbirra; many people, kwarrabarokk
marks, I make, méndirramúggi
mate, addressed as, mídir
moon, láurua
more, do some (*see* another), gallagwa
mosquito, lámtda
mother, álgan; my mother, álganbirra; addressed by son, kwoding; by daughter, nemabirra; mother's brother, únyi
mouth, gwea*r*baulk*w*oa, gwerba
move farther away, yútkwa, yútkeri
Nail of finger and toe, daalla
name,[1] neana
native-companion bird, doluba
near, 'ippóro
neck, gúmudaopgwa
night, dark, dlamaongwa
no, no more, not any, kwaélla
no (do not want it), kwíaok
nose, kwíángwa
nosepin, dlemél*w*ira
now (to-day), illángwa
One, kállaguk
open, tdádtman
opossum, kw'aotkita
orphan, fatherless, báonári; motherless, mundálling; either addressed as, bómbilla
ours, dórennáge
outside,[3] nakk, nakkjin
Pairs, to place in, kwimítlik
palm, an edible, kwillimmba
parrot, blue mountain, willrílma

1. Neána á*d*nlamilla—"What is your name?" It'uma enáma néddle—"What is your boy called?
Name what is itself? *You name your boy.*
2. Tdádman nákkuk miáldama—"Open the door;" Lemúrra dadman—"Look."
Open outside door. *Eye open.*
3. Balallwilwa winnúlma—"Throw it outside?
The middle one throw it away.

perhaps, g'ognáogh
pick it up,[4] morenjim
pinch, áragiki
play, gulamuggi, ílomai, gulomai; children's games, as hide-and-seek, agarut; hide, whistle, and spy, dadwiln'ídung; hold with hands and with legs round waist and fall back, áredbingmung; pushing one another over, daminaji
plenty, gotuk, baratuk, mamóia
pregnant, méloa
pud. hominis, dúbirra, dórkh'ing; mulieris, dínnda
pull off (*see* throw),[5] winnúlla
put it down—I have, anam'ái; this fellow has, gug'ái; put it up there, gwídjinidaong
put on (*see* inside),[6] g'údta
Quickly, hasten, kwíllipbik

4. Arenji ¡bigár—"I pick up (the ball) and catch it."
I pick up him catch.
5. Tráuthera winnuúlla "Pull off my trousers."
Trousers pull off.
6. Aragwa nog'údjo—"Which way do I put it on?" Ngigári buminnyi—"You go and put it away.
Which way you put on? *You go him sit down.*

quiver, of the limbs in the corrobborie, mútmir
Rain, báolmba
ready, are you, barabiddji
ribs, marúlma
ride, bibíddmi
river, kwi'alíggwa
rock to and fro, as a baby to sleep, gugumedla
run, múddli; towards me, from me, nógóld- -erk, -um; dual run,[1] mógoldáriji
Say—I, you, he, a-, ne-, bi- -g'úm; to him, to this fellow, bi-, go--nímbirra; he has said, bárag'úm; he said, bog'um; he is, two are talking, bin-, mán- -g'am; a general talk,[2] gógog'úmbirra
scratch, mutterum
sea (?), kunimíddyénderroa
season, the wet, gwonáreawang
see, báoning, mamann, bannaning, mamanning; seen him, binnging; I have seen,[3] áragobáoning
sharp, as scissors, birúnnki
short-fellow—he, this fellow is, bín-, gón- -nopóllera
shoulder, dáramínndillera; shoulder-blade, mínnikillma
show me, you, nágalítda
shut, méittnamílli
sick, vomit, kumenan
silent, be, gaop; silence! (emphatic), kapp nig'am[4]
sinew, vein, dáonera
sing, gulwagemullam
sister, elder, ánmerk; younger, núllw'ok
sit—you, he, dual, ne-, bi-, mo--gw'inyi; he is, they are sitting,[5] bén-, den- -yin
sleep—you, he, no-, ber- -ramedjin;

1. Nogoldogol—"You run there and run back;" Nakkjin nógoldo—"Run outside."
Outside you run.
2. "No," nég'um binímmbirra neg'ínnyi—"Say 'No,' and tell him to sit down;"
No you say him tell you sit down.
Beritt bog'um—"He says 'Turn.'"
'Turn,' he says.
3. Kwaélla báona—"I do not see it;" Anyólde magáono—"Let me see, too Anyólde
No more see. *Let me dual see* *Let me*
bigwaoning—"Let me have it to see;" Anyold gogwáono—"Let this fellow see;" Baoning
see it. *Let me this fellow see.* *See*
monólkoa—"I see them all about (I see a big mob);" Nemáng-wa magáono—"A revoir;"
all about. *To-morrow two see.*
Arbirra binnging—"Who saw him" Anall ánnyam—"What do you look at me for?"
Who him saw? *What see?*
Angwaon gwérrip—"I fear to see him (the superstition 'evil eye'—'him frightened Eyes'
See this fellow into.
was the interpretation given me)."
4. "You say a silence."
5. Gwan mog'ínnyi *and* Gwinn mogw'ínndi—"Let us two sit here;" It'uma anang-a
There two sit. *Here two sit.* *You I*
mogwándi—"Will you and I live here?" Aragwa nenáni—"Where do you reside?"
two sit down. *Where you sit down?*

you, he has been asleep,[6] nora-, ban- -medjíni
slowly, go, manoi
smoke, a, kwiígwa; a big smoke, meréidlya; to make a smoke, b'udawíllawáollam
smoking, bongbong; to smoke,[7] gógoma
snake, black, daarla; brown, lemirdla; yellow, lamālla; spotted, kwarilla; a small, kwiungulloa; a dreaded poisonous, móromorludyi
son, némérk; son's son, nólyo
sores, gubengoa
spear, jag, mállag'irmá; jagged both sides, ménauilídma; stone, dauinga; reed with point, lúerba; reed without point, g'wirinnda *or* gríinnda
spirit, ghost, portrait, darabóllera
spittle, bilírema; I must spit, meramínnma; to spit phlegm, tokh neg'am

6. Agol médjim—"I shall go to sleep quickly;" Nógol medji *and* Ngigári nógol médji—"You run sleep." *I run sleep.* *You run sleep.* *You go you run sleep.*
"Go to sleep;" Mogwíri medjim—"We two go to sleep;" Aolmédjimuk—"I am sleepy;" *Two go sleep.* *I sleep towards.*
Alladíka beláji berramédjim—"He is going to live at home for awhile;" Aragwa medjia *Wife him gone, him sleep.* *Where sleep*
—"Where will you sleep?"
7. An-ngok gógoma—"Give me a smoke (from your pipe)." *Me give smoke.*

stand, you, negíddyi; standing up,[1] kolknari
star, mámúdlema
steal, guúllibik
stone, damilla
stop—I, you, a-, ne- -g'áo; you, he stay,[2] neddli, biddli; leave off (*see* enough), bánuk
stretch oneself (*see* ill), allínnying; to stretch one's leg, dh'uethth'uel
strong, hard, difficult, dánkal; strong fellow, gwíllagowang; make it strong, negódpingi
sun, lállirra
sweat, kwillúkerra
sweet, dádbon
swim, wālaragum
Take it, you, nágukka; he, this fellow take it, bín-, go- -nukka; take out,[3] magólla, gomólla, boólla (*or* boára, goára)
tea, yabárak
tears, guloa
teeth,[4] dlenb'érkgwe
tell them—I do not want to (*see* say), báragummúggi
testicles, gwiyúwunngwa
thank you, monkáini
that one, yedbirra
that side *or* that way[5], yágolak, yagolágwa
there,[6] yagwa, yagbirra, yenn
this fellow, amilla
this one,[7] gwinnbirra
this side *or* this way, [8] gwinn, gwáonika

1. Kolk agar giddyi—"I stand up;" Kolk ngigar giddyi—"You stand up." *Up I go lift.* *Up you go lift.*
2. Neg'ao—"Stop (walking or other action);" Adnla néddle ngigári—"Why do yo *What you stay? you go.*
stay there? Be off;" Arak biddle—"Where did it (the ball) stop?" *Where him stay?*
3. Banjóllop *and* míllbóllom gollop—"He does not want to take him;" Trautherwa *Trousers*
gogwolla—"May I take off my trousers?" B'útpolla padj'i—"I will take up a good one;" *this fellow take away.* *Him take good.*
Goara bilaji—"He has taken it;" Nákk bimukk binnulla—"He has taken *This fellow taken, it is gone.* *Outside him take, him throw away.*
it out to throw away."
4. Dlenb'érrginum allinnyam—"Toothache." *Tooth ill.*
5. Yákk goláji—"This fellow has gone that way;" Gwan mogwíri—"We two go that *That way this fellow has gone.* *That way two go.*
way."
6. Yún nelaji—"Have you been there?" *There you gone.*
7. Gwinnbirra gwinnbirra gwinnbirra gwinn—"This one, &c., this" (enumerating).
8. Gwinn golaji—"Go this way, eh? (having turned off);" Gwinn gwíllákwa—"This *This way this fellow gone.* *This way big.*
long side (of the table)."

thigh, múkka
thou, it'uma, adáma[9]
three, gállatíllik kállaguk
throat, mangolma
throwing-stick for spear, biláta; for reed spear, billilma
throw it away, agaribob, binnúlma; throw it, this fellow away, bo-, go--ara; I have thrown this fellow, both away,[10] go-, muo- -lomang
thunder, molne; thunderstorm, bierrówa
tickle, bérribíddbirra
tired, ánnélling; a cry of weariness or pain, árrgai...
to - day, illáng-wa; to - morrow, nemang-wa; day after to-morrow, nemann kállaguk
toe, kwiéllgwa
together (*see* pair, to), millik
tongue, kwiaméddloa
too,[9] garra

9. The softer intonation, "adáma," is heard in tones of tenderness, as a boy being with another whom he is loth to leave says "I go," adding "adáma garra" (you too), wistful that his mate should accompany him.

10. It'uma binnúlma—"You throw it away."
You him throw.

truly, gáodloa
turn it,[1] beritt
two, gállatíllik
Up, above, on top, kolkoa
urinate—I, you, agga-, noar--limmb-gwa
Vent, gum'úlwa; from it to bladder (*see* carry), biáttbirra
Wait, I, ādelaong
wake him—you, negíllmi
wash myself, bathe, áramannbittjium; I wash myself, you yourself, ára-, nólo- -mánnbiddji; I wash the clothes,[2] gugumanndub
water,[3] kwáorrowa
wax, in ear, bonórroa
we, dorendbirra; dual, moanmilla
what, analla; what name,[4] adnlamilla
when, 'árgwigám
where, which way, áragwa
whistle, you,[5] will nég'um, willwill nóg'um, willwill rogum
white, clean, árkhngarr
whitefellow, arkhngarramilla
who, which one, árbirra; whose, árbidénnagi
why for, why not,[6] 'arbíddla
widow, widower, bénnbirria
wife, álladik
wind, múnmúnma
wish, want, amalla
womankind, múellabirra
woman, with children, búnbena; old, g'umul
work, I[7] (*see* make), ágg'aganmidji
wrist, mobírma
write (*see* marks), méndirramúggi
Yam, pulida
yes, I assent, g'ogógwe, g'o
yesterday, kwodláogwa
you, (*sing.*) ít'úma; yours, itennage

1. Beritt nogo'itji beritt n'egum—"Turn to the right, turn to the left;" Beriddma nongya?
Turn ? right, turn ? left. Turn ?
—"Turn over;" Berittbing gogomang—"Turn, smoke (reference to forming camp)."

2. Ngigári nolomannbiddji, gállagewirra gungwa biginnyi plátbine gománndop
You go, you wash yourself, another fellow here him sit down plates wash.
Lemálagwa bigári opligkwa beggaganmiddji—"You go and wash yourself, the other
Lemalagwa him go office him make proper.
fellow stay here and wash the plates; Lemalagwa will go to the office and work."

3. Kunult gári gwárroa—"Fetch cold water;" Kwáorroa gwilla bidding—"The water
Fresh catch water Water all fall down.
has all leaked away;" Kórroa gwaélla negwilling—"You have drunk all the water.'
Water no more entirely

4. "What is it? What do I do?" Analla ngigári—"What am I to fetch
What for you go?

5. "Whistle, you say." Will bárag'úm—"Somebody whistled.
A whistle has been said

6. Arbíddla beg'ao—"Why does he not stop?"
Why for stop?

WULNAR.

Most of the words known to me are included in the vocabularies compiled by Mr. W. O. Bennett and Mr. A. J. Todd, and are therefore not reproduced here.

Afternoon, melíter
animal, monulyáner
Bag, owei
big, miyángyer
bird, loaga
breast, woman's, gumúnnya
brother, younger, uita; elder, núllar; my, nulladbunna
Cold, oppógwi
cough, mamurrda
Dark, dlamungwar
day, irning-a
Enough, bíléiya
Fight, wauikattpi
finger, téliámunger
fire you light, leitonga b'ukonwa
Give me, gunmítja
good, nódla
Hair of head, lerrmālner; of face, yāber
hand, mani
husband, lainelónggunya
Ill, āngeaga
insect, moromorā
Mankind, kumaol
many, miapunger
milk, ngoiyer
Navel, lemala
No, kwoddlégo; I do not want, liítter
Open the door, daddmanakwa mogwianagwa
Pelican, yuropiter
pud. hominis, mung-ai
Run to me, mokwel; from me, murbiokwel
Silence, you say a, kupp ninnmi
sister, younger (*see* brother), uita; elder, nelámi
smoke, lenlátimima
stopped, he has, witjunga
Thigh, wonóga
throw it away, linnánnmíttiger
tired, ínnmókattar
tongue, wiiyer
Wake him, lemorr
womankind, mungedmitta

AWARRA

Alligator, bíra
ankle, ann-gro, annmo
ant, little common, bim; yellow, woallum; red, bom
arm, ann-goronng
armlet, dáman
Bad, allwarra
bandicoot, yok
basket, dul
before, bulgmarra; you go on before, yággma bellajin
behind—come on, lura kolajin
belly, anndoyi
belongs to old man, agallawo dattpulla
belt, darabert
birth-delivery, bin-ginyan
blackfellows, nalmok
blood, kuraj
bone, annmau
boy, little, állil; addressed as, warraba; big, auwirra
breast, woman's (*also* milk), d'utut
brother, my, boppa
Calf of leg, annbuin
club, sharp-edged, warawara; blunt, dukkara
cold, allal
come—you, yann; ye,[1] biann
cough, gúlaba
crocodile, maimakko
cuts (cicatrices), darawumerring
Dead, bajum
dog, little, ng'iri
Ear, ann-gónnem
elbow, annkónmo
emu, mórin
empty, made, addwilling
enough, amóge
excrement, gudma
eye, ánndum; eyebrow, anndumónndi
Father, bibi
find it, wādo gunya; I have found it, áddnai
fire, verk
firesticks to produce fire, gwélgma to use them, vagmo
food, moiya
fool, to, múnualgwínn

1. Móann yann—"You come on."

foot, ánn-goba ; footprint, annborra
forehead, annwálma
frog, jakkun
Girl, baby, állmárramáring; crawling, albupáddma; little, pfótátta
give me,[2] bano
go, ya ; he has gone, kaiinnye
goodbye, mamok
good, ammokwao
gum, ironbark, yilyil
Hair of head, mída, annmār; of face, kéttawerk ; of abdomen, tólmida
hand, annábi
head, annbon
hill, gíri
hungry, uyung[3]
I, me, niak
Jabiru, gw'ael
jaw, anndómkok
Kangaroo, kupu
Lips, únnduli
lizard, kúnnimbullo
Man, young, dulᵓgwin ; married, bumbiligo ; old, dáttpulla
micturition, waol
moon, karrong
mosquito, naél
mother, warra ; my mother, bulbil
Name, what, yemín-gi
navel, ánnlánnjérruk
no, wado, waggi; not yet, mutto-waggi ; no more, amalla
nose, annji
Opossum, uoda
Pregnant, moleru
pud. hominis, unnleng, lánnku-benning ; mulieris, ual
Quick, hasten,[1] lukluk
Shoulder, annmónukk
sit, pfaddminninni ; dual sit, gallem galboninni
sleep, maiyuol; I want to sleep, maio m'ai'i
smoke, to, dúbbomélwon, dubbomi
snake, bellum ; water, gunda; brown, báonobaon
sore, bigmi
spear, boko, kówonóro; jag, toltol ; jag two sides, méddobálli ; stone, lauk ; reed, dárin
sun, míral
swim, marrimmar
Talk, mattgo-inge; tell him, kaji, kaji jai
teeth, aliddma
testicles, annmuɛth
thigh, ánndarato, annmullok
throw it away, laggin ; thrown away,[2] addlaggin
throwing-stick, don ; for reed spear, gírikk
thunder, kóddaduᵓridma ; thunder-storm, dúrídmin
tomahawk, dodol
tongue, únnjenn
Walk, main ; you and I, geironga main
water, wik ; drink, wik mábel
way, that, inndubba
what, ábo-in
where, umbulla bajim
woman, old, imbillalgo ; young, addressed as, allamándúba
Yes, yo
you (*sing.*), móann

2. Wik bano—"Give me water."
1. Lukluk bian—"Come on, quick."
2. Wik bilággin—"Throw away the water."

AGGRAKUNDI.

Arm, ajinn
armlet, mamal
Bad, yoyo
bag, dul
belly, margill
blood, gulminn
boy, baby, innbarro ; little, ambut ; addressed as, túmbitúmbi ; big, dárraggit
breast, woman's (*also* milk), ying
brother, boppa
bush, the, bunndi
Calf of leg, ann-gorro
come—you, yann ; ye, bíann
cousin, nawong
crocodile, genult
cry, ra-i
cuts (cicatrices), biling
Dead, nulgmeung
dog, yiri
Ear (*also* toe), adálpi
empty, unwilleing
eye, mibull
eyebrow, marluk
Father, awarrago
firesticks, to produce fire, gibei
food, moiyi
foot, amul
Girl, anmodalpa ; baby, immálwulk
give me, anmo ; I give, bano

go, yak
goodbye,[1] mamaok
Hair of head, mannmār; of face, keddóark
hand, annmoa, abill
head, immbun
hill, garaui
house, small, maiwa
I, me, arraman
Jaw, adámkill
Kangaroo, taning
Laugh, gommenn-gommenn; dual, mogábbinn; they, múgga-mug-gámminn
lizard, small light, mungbéllma; small dark, bónjimm
Man, young, deinmulva
moon, kommil
mosquito, kimmiel
mother, innarrago
mouth, unnyulk
Name, naban
no, kwaella, wagge
nose, agginngelk; nosepeg, gegung
One, udérinn
Opossum, dinng-a
Plenty, wiomopo
pud. hominis, darr, abigelloduk
Quick, warri; come on quickly, allauklauk bian
Run to me, marimari
Shoulder, abelma
sister, mulginn
sit, annínni; you sit, móan annínni; dual, manninni
sleep, aréiyi, máiyi
smoke, I, ámitúbbimi
snake, grass, bann; water, móballágo
spear, stone, kondóbum; reed, láimo
stop, daonok
sun, mawarrik
swim, marbírrami
Teeth, aiímmerríkk
testicles, taiimmell
thigh, abell
throwing-stick for reed spear, dírik
toe (*also* ear), adálpe
Walk,[2] yiark
water, yik
way, a long, malwalk
what, abbon
You (*sing.*), moan

1. Mamok yawarra—"Good-bye, I shall come back."
2. Warri (*or* waggi) arra yiark—"I do not want to walk more."

NATIVES OF THE KATHARINE.

(Contributed by Mr. E. J. Kemp, of Glenelg).

Alligator, dāgul
All right, I am, laguiu
ant, common, cheāk; white, kārab-lungul
apron, man's fringe, jolgon; woman's, ungoruk
arm, murnuk
armlet, willa
Back, the, ngolo
bag, dilly, miyauk
bamboo trumpet, kurnbug
bandicoot, yawk
barramundi fish, mardbing
beard, ngāruk
belly, ngoldāg; full, wei; empty, gugmarin
belt, braak
billabong, nglanga
blind, tumeā
blood, kurak
bone, unmoa
boy, little, megulgul
breast, woman's (*also* milk), gawn
brother, unbuba
Camp, numbura
catfish, chalo
cockatoo, white, ngaruk; black, kāruk; tail feathers of black, didjualla
come back, goyai
crow, yi
cry, dollumun
Daybreak, ungulāra
dog, wild (dingo), wāruk
duck, tilbiuk
Eye, undum
Father, tchardba
fire, wuruk
fish, mardigal
fly, house, morok
foot, undjora
Girl, little, ulwān
go quickly, ngorra-ngorra
go, you, ungān; you and I, negan-nguilo
good, nglāgamura
good-bye, munjungāla
ground, hard, bawl gumma-gumma

hair, bāmjuruk
hand, bārāk
head, mengalap
how are you, ngulāwūl yūgūna
Jabiru, paunóru
Kangaroo, kupu
knee, umbārt
Laugh, yeaumun
leg, ungarra
leave it, ponga
lip, ngālk
lizard, yang
Man, kingulpoya; old (*also* woman), tholba-tholba
mine, nāgulung; this belongs to me, ngāgulu wārre
mosquito, beundo
mopoke bird, gogulporuk
mountain range, bāran ngire
moon, deāt
mother, kārung
Nails, unbillum
night, gullaruk
nose, gamul; nose stick, maruk
Opossum, wirik
Quail, jirik
Rain, wāāk
river, unboa, ngugmāri
Sandfly, ngāla
sick, I am very, kulwutma
sister, dinda
smoke, undumugma
spear, bogo
stone, pāāt
sun, giguil
swordfish, chulwul
Teeth, nglaidmor
tomahawk, mardi
tree, laianth
turkey, beinuk
What is that, guliānā
whistle, wirdmun
woman, old (*see* man), tholba-tholba

Descriptions of New or Little-known Species of Blattariæ, Gryllacridæ, and Stenopelmatidæ collected at Lake Callabonna, S.A.

By J. G. O. Tepper, F.L.S.

[Read November 6, 1894.]

The various forms of Orthopterous insects which form the subject of these notes were collected by Mr. A. Zietz during the latter half of 1893, at Lake Callabonna, as bye-work whilst engaged there in the exhumation of Diprotodon and other fossil remains. The specimens referred to form part of the entomological collection in the South Australian Museum.

SECTION BLATTARIÆ.

FAMILY PHYLLODROMIDÆ.

Phyllodromia magna, *spec. nov.*

Ochreous testaceous; head only *slightly* prominent, face with a broad blackish band between the bases of the eyes; antennæ blackish, basal joints pale; pronotum slightly *wider than long*, *emarginate in front*, with two broad straight black stripes, wider behind (*not* curved), space between them of the *same* color as the margins and the elytra; elytra concolorous (wings not observed), veins dark, branches parallel, only divergent at the base; legs pale, concolorous; abdomen above banded with black, ventral segments each with an intramarginal black spot; cerci blackish, banded pale; subgenital lamina broad, rotundate, with a short dark oblique streak on each side, and a blackish dot near the apex.

	Female.
Length of body	21 mm.
Length of elytra	22 "
Length of pronotum	3·5 "
Width of pronotum	4 "

The single specimen obtained appears to resemble *P. Germanica*, L., but is much larger, the pronotum less transverse, the black stripes of unequal width, and the anterior margin distinctly emarginate; whilst the branches of the radial vein of the elytra only diverge at the base, being otherwise parallel throughout.

The abdomen also is differently marked. This species appears to be the largest hitherto described.

PARATEMNOPTERYX ZIETZII, *spec. nov.*

Brown to blackish, paler below, shining; head free, an ill-defined, narrow, curved black bar between the eyes; *ocelliform spots obsolete;* clypeus pale, basal area of the antennæ whitish, latter very slender, as long as the body, pale brown. Pronotum elliptical, margins very narrow, disk more or less distinctly excavated, anlges rounded, hindmargin straight. Elytra nearly *quadrangular* veins distinct, raised, scarcely *exceeding the first abdominal segment.* Wings rudimentary. Legs uniformly pale brown, fore femora crowdedly spinose, all more or less ciliate (tarsi without arolia). Abdomen with dorsal segments finely scabrous along the hind margins, angles not produced, except those of last segment. Ventral segments brown to black, shining. Supra-anal lamina *longer than wide*, subtrigonal, *posterior third incurved*, apex rounded. Cerci very long, acute. Subgenital lamina very large, cucullate, hindmargin entire, bearing the short, suberect styles; latter black above, pale beneath.

	Adult males.	Male and female larvæ.
Length of body ...	18 –19 mm.	13–15 mm.
Length of elytra ...	4 – 5 "	—
Length of pronotum	4·5– 4·8 "	3–3·5 "
Width of pronotum	6 – 6·5 "	4–5 "

There are two full-grown males and three larvæ, one of them apparently a female. The species is distinguished from *P. australe*, Sauss., by its larger size, absence of ocelliform spots, much shorter elytra, and the peculiar form of its anal appendages. The larvæ are much darker, inclining to black. The vertex of the head is paler than the very dark face.

FAMILY PERISPHAERIDÆ.

LEPIDOPHORA, *gen. nov.*

Resembling *Perisphaeria glomeris*, Sauss., in aspect. Body convex, elongate, stout. Anterior angles of dorsal segments produced laterally as a subtrigonal scale overlapping imbricately the respective ventral segments at their base. Supra-anal lamina quadrate, posterior angles produced as short spines. Subgenital lamina subtrigonal, apex produced, forming two conspicuously diverging spines. Styles slender, as long or longer than the lamina.

The scale-like appendages along the lateral ventral margin, to which the name refers, are apparently a novel character among

the Blattariæ, as I have hitherto not observed it myself, and I am unacquainted with any reference thereto either by description or figure in the literature available. Similarly the form assumed by the subgenital lamina is quite unusual. These features justify therefore, I think, the establishment of a new genus for the species, which for the present at least is located among the Perisphæridæ, to which in general aspect it appears to fit best, but it may require, when better known, to be removed elsewhere.

LEPIDOPHORA FURCATA, *spec. nov.*

Black, finely rugulose, wingless. Body much curved. Head concealed, glossy; vertex and face reddish-piceous; sides, foremargin of clypeus, and trophi pale testaceous. Antennæ much shorter than the pronotum, slender, reddish. Eyes irregularly reniform or wedge-shaped. Pronotum elliptical, margin narrow, not much reflexed, laterally incrassated, less so in front, arched; hindmargin concave, angles subacute. Meso- and metanotum similar. Abdomen dorsally almost smooth, hindmargin of segments with minute raised points, straight, rectangular laterally, angles of the seventh segment produced as a short red spine; beneath piceous laterally, disk reddish, penultimate ventral segment narrow, reddish. Legs rather short; internal spines of fore femora short, crowded, very numerous, external ones longer, few, and distant. Coxæ pale testaceous, base piceous, remainder reddish. Tarsi long, beneath dilated, whitish. Supra-anal lamina with hindmargin ciliate, pale reddish. Cerci lanceolate acute, longer than the lamina, dark red. Styles reddish.

	Male.
Length of body...	24 mm.
Length of pronotum	6·6 "
Width of pronotum	10·5 "

A single male was obtained, but I have since got another from elsewhere. The specific name refers to the peculiar form of the supra-anal appendage.

SECTION LOCUSTODEA.

FAMILY GRYLLACRIDÆ.

EONIUS CALLABONNENSIS, *spec. nov.*

Resembling *E. tigrinus*, mihi (Trans. Roy. Soc. S.A., XV., 163), paler. Vertex and front of the head pale, clouded darker; apex of mandibles obliquely truncate, toothed, *deep black*. Pronotum with the fore and hindmargin each slightly marked with a blackish band, longer than in the allied species. Elytra ovate, slightly extending beyond the hindmargin of the meta-

notum, veins distinct. Wing-lobes rudimentary, concealed by the elytra. Hind femora with *six pairs* of small spines. Hind tibiæ with four to six external and six to eight internal spines, all black at the apex. Femora near apex, and all the tibiæ and tarsi, hirsute, like *E. tigrinus* (omitted to state in monograph). Ovipositor *very slender* and long, nearly straight, acute, apex black.

	Female.
Length of body	36 –37 mm.
Length of elytra	5 5– 6 "
Length of pronotum	7 – 8 "
Length of hind femora	19 –20 "
Length of ovipositor	43 –48 "

The two specimens obtained differ principally from *E. tigrinus* (independently of color and size) in the black, toothed apex of the mandibles, almost concolorous pronotum, much longer elytra, different arrangement and size of spines, and the more slender ovipositor; from *E. atrofrons* and *E. fumatus* in much larger size, pale head, and number, &c., of spines.

The ova were extracted from both the specimens, and proved to be nearly mature, in the one more so than in the other. One yielded 47, the other 24, a small proportion were only about half-grown. The mature ones were brown, elongate elliptical, 5–5·5 mm. in length, somewhat thicker on one end than the other, each terminating with a circular, smooth, shining, darker lid, the intermediate portion being ornamented with crowded microscopical papilla, arranged in regular diagonals. The small, immature (or male ?) ova are almost cylindrical.

Eonius atrofrons, *Tepper* (Trans. Roy. Soc. S.A., XV., p. 164).

Two specimens were secured, viz., a nearly mature male nymph (the first example of this sex for the genus) and a female larva. As the species was originally established from a single female, these not only confirm its validity, but the former supplements the generic description, hence a full description becomes necessary.

Male (nymph) similar to female, but considerably smaller. Abdominal segments 8 and 9 almost concolorous; hindmargin of the latter straight, angles lobe-like produced. Supra-anal lamina transverse, divided by four furrows into five unequal parts, the central sulcus produced posteriorly as a dilated rotundate lobe, and longer than the basal part. Cerci very short, apex blackish. Subgenital lamina small, subquadrangular, rather longer than wide, simple. Styles minute.

	Male.	Fem. larva.
Length of body ...	21·5 mm.	18 mm.
Length of pronotum ...	4 "	3 "
Length of elytra ...	2 " (rud.)	—
Length of hind femora	10 "	8 "

The black face is so conspicuously characteristic of the species that it scarcely can be mistaken for any other yet known. The ovipositor of the female larva is scarcely conspicuous.

FAMILY STENOPELMATIDÆ.

PENTHOPLOPHORA DRIFFIELDI, *Tepper* (Trans. Roy. Soc. S.A., XV., p. 175).

Of this species fifteen specimens were obtained, viz., six adult and four larval males, and one adult and four larval females, the larvæ representing various ages, the youngest being only 9 mm. in length, while the oldest is almost full grown, but presents the ovipositor still in its recurved position, and much abbreviated. This being the first instance of males having been secured, the description is added.

Male. Similar to female, somewhat smaller, paler, and the markings less defined. Abdomen with the eighth segment cucullate, hindmargin sinuate, angles and middle slightly produced, rotundate, concave parts with numerous, minute, dark-brown toothlets; the ninth segment only exposed posteriorly, contracted, trigonal, apex broadly rotundate, disk on each side with a conical protuberance surrounded by a depression, its apex formed by a small, blackish, outwardly curved acute spine, from which extends laterally a short blackish ridge. Cerci short, slender, hirsute, pale. Last ventral segment of abdomen transverse, hind margin very sinuate, middle much produced with two short, thick, obtuse, blackish spines near apex. Styles short, glabrous, apex blackish.

	Adult.	Larvæ.
Length of body (Male)	30–40 mm.	9 –26 mm.
Length of pronotum ...	5– 6 "	1·5– 4 "
Width of pronotum ...	8– 9 "	2 – 6 "

The considerable difference in length is most probably largely due to unequal contraction after death while immersed in alcohol, through which also the color has been considerably affected.

The dark bands are caused by a pigment, so loosely deposited upon the thin translucent integument, that it becomes detached when one attempts to remove the intestines, no matter how carefully. This may serve as a hint for recipients of spirit specimens, or fresh ones as well, who may attempt the operation. If the specimens have been preserved in weak spirit, I find it best to

immerse them in strong spirit for a sufficient time to harden them; then mount quickly, as most of them when drying rapidly retain their shapes fairly well.

These insects, as stated by Mr. A. Zietz, inhabit (singly) burrows excavated by themselves in sandy parts of the lake basin. They are perfectly circular in form, about three-quarters of an inch in diameter, twelve to eighteen inches deep, and at the bottom somewhat dilated so as to allow the inhabitant to turn round easily. Where the sand is dry, *i.e.*, the upper part of the shaft, the grains on its surface are securely fixed by some cement. Around the mouth a mound, an inch or more, raises the entrance by so much above the general surface, and is sloping outwardly. The pellets of excavated soil are carried by the insect to a distance of six to nine inches from the entrance, and disposed there in a regular circle. When a grass stalk is first pushed into the hole, the insect comes up to ascertain the cause of disturbance, and then withdraws, and will not come up again. When dug out, they refuse to fly from their foe, but will resolutely face him, whatever way he turn, standing on the defensive, and move rather towards him than otherwise.

On some Important Reactions of Double Cyanides bearing upon the Cyanide process for the Extraction of Gold.

By G. A. Goyder.

[Read December 3, 1894.

While endeavoring to find an accurate process for the quantitative determination of simple cyanide of potassium in solutions containing also double cyanides, such as the sump liquors obtaining in the McArthur-Forrest process for extracting gold, I found that cyanide of potassium was alkaline to phenol phthaleïn, and that the quantity of alkaline cyanide present could be accurately determined, in the absence of caustic alkalies and alkaline carbonates, by titrating with acid, using phenol phthaleïn as indicator. The presence of bicarbonates makes the end reaction more uncertain, but by adopting special precautions accurate results may still be obtained. The double salt zinc potassium cyanide is quite neutral to phenol phthaleïn. I am further investigating this reaction with the object mentioned above.

It appears to be generally believed that such double salts as zinc potassium cyanide in aqueous solution have no solvent action on gold. I have, however, found by experiment that this double cyanide readily dissolves gold, although the action is slower than that of the simple alkaline cyanides. When a solution of zinc potassium cyanide is shaken with gold-leaf in the presence of oxygen, or air, the gold is dissolved, forming gold potassium cyanide, while zinc is deposited as oxide. A secondary reaction also takes place, involving the formation of the auricyanides of zinc and of potassium, the former of which appears to be insoluble, and of zincate of potash. Copper potassium cyanide also dissolves gold, although the action is still slower than that of the zinc double salt. It is hardly necessary to point out that the above reactions may be of considerable importance in the McArthur-Forrest process.

In order to determine the total cyanogen in sump liquors I have devised the following modification of Rose & Finkener's process:—A measured quantity of the liquor is heated on the water bath, or gently boiled, for 20 minutes with excess of oxide of mercury with occasional agitation, filtered and washed. To the filtrate about one gram. of caustic soda is added and excess

of sulphuretted hydrogen water to precipitate the mercury. After being well shaken, filtration not being necessary at this point, excess of carbonate of bismuth is added to precipitate the residual sulphuretted hydrogen, well shaken, filtered and washed, and the filtrate titrated with silver nitrate after the addition of a little potassium iodide to sharpen the end reaction which is indicated by a faint permanent opalescence. One molecule of silver nitrate used indicates two molecules of cyanogen present.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read April 8, 1895.]

XVII.

CARABIDÆ.

An important and very able memoir by Mr. T. G. Sloane on Australian *Carabidæ* appears in the recently published Part (III., 1895) of the Proceedings of the Linnean Society of New South Wales. Some of Mr. Sloane's proposals—*e.g.*, the merging of the *Morionides* and *Trigonotomides* in the *Feroniides*, and of *Notonomus* and *Sarticus* in *Pterostichus*,* while *Loxandrus Prosopogmus*, &c., are treated as genera—certainly appears to me on first thoughts open to much objection; neither can I acquiesce in Mr. Sloane's apparent reluctance to regard sexual characters as of classificatory value (illustrated by his uniting *Nurus* and *Homalosoma* on the ground that they do not seem to differ except in respect of sexual tarsal characters). As however the memoir was published in Sydney only a week ago, I have not had time to do more than hastily run my eyes over it and am not justified in seriously criticising it on the strength of so slight an acquaintance with its contents, nor should I have discussed it on this occasion if it had not been that Mr. Sloane refers here and there to what I have myself written concerning some Australian *Carabidæ* and in at least one instance seems to invite further information from me which this seems a good opportunity to furnish.

In dealing with *Leptopodus*, Chaud., Mr. Sloane refers to my having expressed the opinion that it is scarcely distinct from *Simodontus* on the strength of its having been formed for the reception of *Pterostichus holomelanus*, Germ., but thinks that (although he agrees *P. holomelanus* is a *Simodontus*, yet) inasmuch as M. Chaudoir attributed also other species to *Leptopodus* some of which stood in need of a new name *holomelanus* ought to be relegated to *Simodontus* and *Leptopodus* retained for other species. I think Mr. Sloane is right in this view of the matter.

---

* I observe that in a footnote Mr. Sloane himself hesitates considerably on this point.

Mr. Sloane in a footnote states that *Rhytisternus sulcatipes*, Blackb., is *R. lævilaterus*, Chaud. I cannot look upon this as more than a guess, inasmuch as M. Chaudoir never really described *lævilaterus* but only indicated its differences from *R. liopleura*. Of course it *may* be *sulcatipes* but inasmuch as M. Chaudoir says that in *lævilatera* the fifth elytral stria is "omnino obliterata," while in *sulcatipes* that stria is perfectly traceable throughout the length of the elytra; and as moreover *lævilatera* is said to be from Queensland while I have seen *sulcatipes* only from Southern Australia, I look upon the identity of the two as far from being established.

Discussing the affinities of *Cyclothorax* Mr. Sloane expresses a doubt whether that genus can be placed in any of the recognised tribes of *Carabidæ*. I think however it may be placed in the tribe for which (Proc. L.S., N.S.W., 1892, p. 85) I proposed the name *Amblytelides*.

Mr. Sloane agrees that, as stated by me Tr. Roy. Soc., S.A., 1894, p. 203, *Cyclothorax cinctipennis*, Black.=*C. (Phorticosomus) lateralis*, Cast.

Australian coleopterists owe a debt of gratitude to Mr. Sloane for such a memoir as this on which I am commenting. I sincerely hope that he will be able by degrees to treat all the larger genera of Australian *Carabidæ* as he has now treated *Homalosoma* and *Rhytisternus*, and that in due course the tribes of *Lebiides* and *Harpalides* will be dealt with by him after the manner in which he has dealt with the *Feroniides*.

TRECHUS.

T. atriceps, Macl. In Proc. L.S., N.S.W., 1892, p. 97, I mentioned having seen the type of this species at Sydney and noted that it seemed to be a *Thenarotes*. Recently Mr. Masters has been good enough to send me an example and I find that my opinion was correct. It is very close to my *Thenarotes discoidalis* var. ? *minor*, but certainly distinct, being much smaller and having the basal part of its prothorax differently sculptured. In *T. atriceps* there is a basal punctulate depression extending almost from the central channel to the lateral margin scarcely deepened into a fovea in the middle, while in *T. minor* the punctulate space is a distinct (though not sharply defined) fovea separated from the central channel by a considerable unpunctured interval.

GYRINIDÆ.

DINEUTES.

D. inflatus, sp. nov. Fem. Latissime ovatus; supra obscure viridis, prothorace elytrisque sat longe intra marginem lateralem vitta sat lata obscure cupreo-aurea (hac postice

abbreviata) ornatis; subtus piceo-ferrugineus, pedibus anticis concoloribus, posterioribus 4 paullo dilutioribus; supra fere lævis obsolete rugatus, rugis in capite prothoraceque confusis in elytris longitudinaliter dispositis, in elytrorum parte externa paullo magis distinctis substriiformibus; elytris in parte mediana magis quam latera versus convexis, parte cupreo-aurea leviter subimpressa, apicibus singulatim rotundatis. Long., 6 ; lat., 4 l. (vix).

Easily distinguishable from all the previously described Australian *Gyrinidæ* by its great width, its length being scarcely more than half again its breadth.

Victoria.

HYDROPHILIDÆ.

PHILHYDRUS.

P. eyrensis, sp. nov. Ovalis ; nitidus ; piceo-niger, palpis antennis tibiis tarsis et capitis prothoracis elytrorumque marginibus lateralibus rufis vel rufo-testaceis ; supra sat æqualiter crebre sat fortiter (elytris quam caput prothoraxque paullo magis fortiter) punctulatus ; elytris puncturis nonnullis (his seriatim dispositis) vix majoribus impressis. Long., $2\frac{1}{2}$ l. ; lat., $1\frac{1}{4}$ l.

This species is extremely like *P. melanocephalus*, Fab., and is probably the insect on the authority of which *P. melanocephalus* has been credited (I believe it is in Dejean's Cat.) to Australia. But it differs from *melanocephalus* in its head not being impressed in front of the eyes, in the evidently less strong puncturation of its prothorax and in its palpi being scarcely infuscate at the extreme apex.

Eyre's Peninsula.

HYDROCHUS.

H. Palmerstoni, sp. nov. Minus elongatus ; sat nitidus ; viridis, elytris brunneis, cupreo-submicantibus ; antennis palpis pedibusque sordide testaceis, genubus infuscatis ; capite inter oculos longitudinaliter 3-sulcato ; prothorace cordato sat crebre ruguloso-punctulato, indisco minus perspicue 3-areolato ; elytris seriatim punctulatis, puncturis basin versus sat parvis postice permagnis foveiformibus. Long., $1\frac{1}{10}$ l. ; lat., $\frac{2}{5}$ l.

A remarkable species on account of the peculiar sculpture of its elytra, the seriate punctures being in the basal one-fourth comparatively small and the interstices between the series continuous and well defined, while before the middle the seriate punctures become extremely large round foveæ of diameter greater than the width of a puncture and an interstice together in the

basal part so as to leave no continuous straight interstices between the foveæ.

Near Palmerston, N. Terr. ; taken by Mr. Walker.

BEROSUS.

B. munitipennis, sp. nov. Ovalis ; convexus ; nitidus ; supra pallide testaceus (exemplis nonnullis sparsim fusconotatis), capite prothoraceque rufescentibus ; subtus obscurus, antennis palpis pedibusque testaceis ; capite æquali, fortiter crebre antice minus crebre) punctulato, prothorace transverso fere ut caput (sed minus crebre quam hujus pars postica) punctulato ; elytris minus fortiter punctulato-striatis, ad apicem leviter emarginatis, parte emarginata extus ut spina gracilis perlonga producta, interstitiis planis sparsim sat fortiter punctulatis. Long., $2\frac{1}{2}$ l. ; lat., $1\frac{1}{5}$ l.

Allied to *B. externe-spinosus*, Fairm., but differing from that species, as described, by the much coarser puncturation of its head, its entirely testaceous legs, &c. ; differing from Queensland specimens in my collection (which I have no doubt are Fairemaire's species) and from all the other described Australian *Berosi*, also by the very long slender spine into which the external apices of its elytra are produced.

S. Australia ; taken by Mr. Zietz near Lake Callabonna.

NOTOBEROSUS (gen. nov. *Hydrophilidarum*).

Beroso affinis ; differt antennis brevioribus specie 6-articulatis (articuli 3us 4us que minutissimi cum 5° intime conjunguntur), hoc quam 6° multo latiori ; mesosterno haud carinato.

The insect for which I propose this name has very singular antennæ. Examined under a Coddington lens they appear to consist of six joints, the basal two much like those of a *Berosus*, the third conical and at its apex much wider than any of the three joints which compose the club. Under a compound microscope however the basal part of this apparent third joint seems to consist of two minute joints intimately joined to each other and the second of them to the large joint that follows.

N. Zietzi, sp. nov. Ovalis ; nitidus ; glaber ; supra albido-testaceus, clypeo capiteque in medio et postice plus minusve nigris vel obscure fuscis ; mesosterno metasterno et abdomine nigris ; antennarum clava vix infuscata ; capite prothoraceque (hoc transverso æquali) subtiliter crebre punctulatis ; elytris nullo modo striatis, sparsim inæqualiter (hic illic subseriatim) punctulatis ; nonnullorum exemplorum (? marium) puncturis raris permagnis juxta suturam positis. Long., $1\frac{3}{5}$ l. ; lat., $\frac{4}{5}$ l.

The punctures of the elytra are of several different sizes con-

fusedly and not closely intermingled; in some specimens (apparently, from the few examples taken, males) a few of these are much larger than the rest and are placed near the suture along its front half. In the male the hind margin of the penultimate ventral segment is widely and sinuously emarginate.

S. Australia; taken by Mr. Zietz near Lake Callabonna.

NITIDULIDÆ.

MACROURA.

M. Baileyi, Blackb. In Trans. Roy. Soc. S.A., 1894, p. 204, I stated that this species seemed to be identical with *Carpophilus obscurus*, Macl., on the authority of a specimen sent to me by Mr. Lea and compared by him with Macleay's type. I much regret to find that this was an error. I have since received the same species from Mr. Masters as *Nitidula concolor*, Macl., and on investigation I find that the latter name is right and that Mr. Lea's label must have been a *lapsus calami* or by some oversight have been attached to the wrong specimen. I therefore must withdraw my assertion regarding *C. obscurus*, Macl., and notify that it is *Nitidula concolor*, Macl., to which it applies.

LAMELLICORNES.

ONTHOPHAGUS.

O. Leai, sp. nov. Robustus; piceus, antennis palpisque testaceis; nonnullorum exemplorum pedibus rufescentibus; subtus rufo-hirsutus; clypeo antice late rotundato; capite creberrime subtilius transversim, prothorace (hoc subcanaliculato) paullo minus crebre minus subtiliter longitudinaliter, rugulose; elytris modice striatis, striis vix manifeste punctulatis; interstitiis sat planis sparsim leviter nec subtiliter punctulatis; tibiis anticis extus 4-dentatis (processu apicali incluso).

Maris; capite postice lamina subtransversa erecta alta armato, hac ad apicem utrinque et in medio acute prominenti; prothorace antice latissime perpendiculariter declivi, superficie perpendiculari areis 3 concavis constituta, supra aream perpendicularem medianam prothoracis dorso ut lamina horizontalis profunde bifida producto. Long., 8—9 l.; lat., 5—5¼ l.

This fine species is in most respects very much like *O. ferox*, Har., but differs from it in the shape of the frontal horn of the male which is a transverse lamina (not much wider however than high), rugulose on its face and smooth on its hind surface, outline (viewed from the front) forming three triangles one on each side with its apex directed outward and one on the top with its apex directed upward; the rugulosity of the prothorax

moreover is markedly finer and closer than in *ferox* and of conspicuously longitudinal arrangement, the anterior projection of the prothorax is more flatly horizontal with its lobes non-divergent, &c., &c.

N.S. Wales; taken near Forest Reefs by Mr. A. M. Lea.

APHODIUS.

A. callabonnensis, sp. nov. Minus convexus; sat nitidus; piceus vel nigro-piceus, prothoracis lateribus elytris (maculis nonnullis fuscis exceptis) pedibusque (præsertim femoribus posterioribus) testaceis; capite mutico, sparsim sat fortiter punctulato, clypeo antice sinuato-truncato; prothorace ad latera capillis elongatis fimbriato, postice haud marginato, lateribus modice arcuatis, angulis posticis obtusis; scutello parvo sparsim punctulato; elytris subtiliter striatis, striis seriatim punctulatis, interstitiis suturali 3° 5° que fortiter convexis externis uniseriatim punctulatis; tibiis anticis extus bidentatis (dente apicali incluso); tibiis posticis setis inæqualibus instructis; tarsorum posticorum articulo primo elongato (quam 2us 3us que conjuncti paullo longiori), 2° quam 3us longiori.

Maris prothorace subtiliter, feminæ magis fortiter, sparsim punctulato. Long., $2\frac{4}{5}$ l.; lat., $1\frac{1}{5}$ l.

Allied to *A. sus*, Fab. The fuscous spots on the elytra are one on the fourth interstice immediately in front of the middle and several considerably behind the middle placed in a transverse line and more or less run together. Also resembles *A. lindensis*, Blackb., differing from it *inter alia* by its bidentate front tibiæ, clypeus truncate in front, sides of prothorax not emarginate behind, elytral costæ more prominent. *A. Candezei*, Har., also seems (from description) to resemble the present species but belongs to a different section of the genus having its prothorax margined behind.

Lake Callabonna; taken by Mr. Zietz.

ATÆNIUS.

A. Zietzi, sp. nov. Subovatus; nitidus; rufus vel piceo-rufus, nonnullorum exemplorum capite prothoraceque obscurioribus; clypeo antice triangulariter emarginato; capite crassissime ruguloso; prothorace inæqualiter nec crebre sat grosse punctulato; elytris fortiter punctulato-striatis, in striis puncturis parvis minus perspicuis, interstitiis sat æqualibus leviter convexis (nullo modo cariniformibus), humeris dente minuto acuto armatis. Long., 2 l.; lat., $\frac{4}{5}$ l.

Distinguished by its equal *(inter se)* and non-cariniform elytral interstices from *A. australis*, Hope and from all the Australian

Atænii that I have described except *A. goyderensis* (of the Horn expedition); the latter differs from it by its black color and much less coarsely punctulate prothorax. The species described by Sir W. Macleay as *Ammœcii* (some at least of which seem to be *Atænii)* all have either cariniform elytral interstices, or very deeply punctulate elytral striæ or differ greatly in size from the present species, and are all from parts of Australia very far distant from Lake Callabonna.

Lake Callabonna; taken by Mr. Zietz.

TROX.

T. Crotchi, Har. I have lately received an example from the collection of M. Thomson under this name, which agrees very well with Harold's description and I have no doubt is correctly named. It is clearly identical with specimens from Central Australia which I had attributed to *T. Crotchi* and is very close to *T. eremita*, Blackb., but I think the latter is a good species, as it differs from the type of *Crotchi* in having the larger tubercles on its elytra less large and of more elongate form also more numerous than the corresponding tubercles in *Crotchi* and also differs in the external teeth of its front tibiæ considerably smaller and more obtuse.

T. strzeleckensis, sp. nov. Sat late ovatus; opacus; niger, indumento sordido vestitus; capite minus crebre nec rugulose punctulato, bituberculato; clypeo antice fortiter angulato; prothorace quam longiori fere duplo latiori, postice in medio fortiter lobato, ut caput punctulato, supra costis tuberculisque nitidis sat angustis inæquali, lateribus sat fortiter trilobatis, angulis posticis obtuse rectis; elytris seriebus 10 tuberculorum elongatorum (his costas fractas simulantibus) inter se æqualibus insignibus, tuberculis majoribus vix elevatis nitidissimis per superficiem totam hic illic intermixtis, serierum interspatiis seriatim minute granulatis; tibiis anticis extus dentibus 2 (mediano et apicali) permagnis armatis; prosterno postice vix prominulo. Long., 6—7 l.; lat., 4—4$\frac{1}{5}$ l.

The sculpture of the elytra is the strongly distinctive character of this species; it consists of eight opaque rusty-looking cariniform lines on each elytron which are similar *inter se* except that the second and fourth are less broken near the base than the rest, each of which is broken into short pieces (about 15 in number), and besides which there are on each elytron a somewhat similar but less defined line close to the suture and two ill-defined ones between the eighth and the lateral margin, a number of scarcely elevated somewhat star-shaped nitid spaces scattered confusedly over the elytra, and a row of very minute granules between each

two of the above mentioned broken carinæ. This insect is perhaps near to *T. Brucki*, Har. (which is known to me only by description), but cannot be identical with it since *Brucki* is described "processu prosternali valde tumidulo" whereas the prosternal process of this species is as slightly developed as in any *Trox* known to me; it is angular behind but scarcely projects beyond the general contour of the prosternum.

Lake Callabonna and Strzelecki Creek; taken by Mr. Zietz.

LIPARETRUS.

L. distinctus, sp. nov. Sat nitidus; supra fere glaber; brunneo-testaceus, nonnullorum exemplorum capite subinfuscato; hoc cum prothorace crebre subfortiter punctulato; clypeo antice plus minusve fortiter tridentato vel trisinuato; prothorace fortiter transverso, manifeste canaliculato, antice minus angustato, lateribus sat rotundatis; elytris sat fortiter geminato-striatis, interstitiis sat crebre sat fortiter punctulatis; pygidio crebre fortiter punctulato; tibiis anticis extus dentibus 2 (apicali incluso) elongatis acutis et alio parvo supra medium armatis; tarsorum posticorum articulis basalibus 2 subæqualibus; antennis 9-articulatis.

Maris segmento 2° ventrali penicilla hirsuta perlonga postice in medio instructo; feminæ mutico. Long., $3\frac{1}{2}$ l.; lat., 2. l.

This is the only described species (of the section having the front of the clypeus tridentate) of uniform testaceous color.

Lake Callabonna; taken by Mr. Zietz.

L. melanocephalus, sp. nov. Præcedenti valde affinis; capite, elytrorum basi summa, sternis, segmentis ventralibus (apicali excepto) et tibiis tarsisque posticis atris; tarsorum posticorum articulo 2° quam 1us manifeste breviori; cetera ut præcedentis *(L. distincti)*.

Maris segmentis ventralibus (apicali excepto) in medio penicilla transversa instructis; feminæ muticis. Long., 3 l.; lat., $1\frac{4}{5}$ l.

Lake Callabonna; taken by Mr. Zietz.

L. aridus, sp. nov. Sat nitidus; supra fere glaber; testaceus; capite minus crebre minus subtiliter punctulato; clypeo antice subtruncato (maris quam feminæ minus late); prothorace fortiter transverso, sat sparsim sat subtiliter punctulato, haud canaliculato, antice minus angustato, lateribus angulisque posticis rotundatis; elytris leviter geminato-striatis, interstitiis leviter sat crebre punctulatis; pygidio sparsim leviter (fere obsolete) punctulato; tibiis anticis extus dentibus 2 (apicali incluso) modicis et alio minuto supra medium armatis; tarsis gracilibus, posticorum articulo 2° quam 1us manifeste longiori; antennis 9-articulatis.

Maris quam feminæ statura magis angusta, antennarum flabello magis elongato. Long., 3 l.; lat., $1\frac{2}{5}$—$1\frac{7}{10}$ l.

At once distinguishable (in the group of *Liparetri* having the antennæ 9-jointed, the clypeus more or less rounded or subtruncate in front, and the body glabrous, or nearly so, above) by its uniform pale testaceous color. The flabellum of the antennæ is nearly white.

Lake Callabonna; taken by Mr. Zietz.

COLPOCHILA.

C. palpalis, sp. nov. Sat elongata; nitida; supra subglabra, prothorace et elytrorum basi capillis elongatis fimbriatis; subtus (abdomine pygidioque capillis subtilibus erectis sparsim vestitis exceptis) dense hirsuta; albido-testacea, capite (hoc plus minusve infuscato) pedibusque (horum dentibus spinis et carinis plus minusve infuscatis) rufescentibus, prothorace pallide brunnescenti; capite fortiter sat crebre rugulose (clypeo, parte postica excepta, subtiliter nec rugulose), prothorace subtiliter sparsissime, elytris (his obsolete geminato-striatis) leviter vel vix manifeste, pygidio leviter sparsissime, punctulatis; antennis 9-articulatis; prothorace quam longiori fere duplo latiori, antice modice angustato, obsolete canaliculato, basi vix bisinuata, lateribus fortiter rotundatis, angulis anticis acutis posticis rotundatis; elytrorum apice haud producto.

Maris antennarum flabello quam articuli præcedentes 5 conjuncti sat longiori; palporum maxillarium articulo apicali dilatato, quam præcedentes 2 conjuncti sat longiori; tibiis anticis (exempli typici) carentibus.

Feminæ antennarum flabello quam articuli præcedentes 5 conjuncti vix longiori; palpis maxillariis normalibus; tibiis anticis extus fortiter 3-dentatis. Long., 10 l.; lat., $5\frac{4}{5}$ l.

This insect is very remarkable by reason of the form of the palpi in the male, which are fully as long as the head, the apical joint being dilated and especially elongate; its form is curved and its upper surface is deeply bisulcate, the space between the sulci convex, presenting the appearance of the joint being a husk split open lengthways and revealing an enclosed kernel. It is unfortunate that the only male in the collection has lost its front legs as without examining those organs it seems just possible that the species ought to be regarded as an aberrant member of the *Clavipalpides*. Its simple claws, however, and mandibles of the *Sericoid* type point strongly to the probability that the front legs of the male are not of the *Clavipalpid* type. I have dissected a female and failed to find any character to distinguish it rom a female *Colpochila*, so I feel little doubt that the insect

belongs to the *Sericoides* and can be separated from *Colpochila* only by the peculiar palpi of the male. It seems undesirable to omit describing this insect in spite of the imperfection of the male type, as it is from a remote inland locality whence more material cannot be expected at any early date ; nor does it seem practicable to found a new genus on it without examining an unbroken male. If the difference from *Colpochila* prove to be limited to that of the male palpi I doubt whether it can rightly be treated as generically distinct from *Colpochila*, and, for the present at any rate, it seems best to place it in that genus, of which it has entirely the facies. In my tabulation of *Colpochila* (Proc. L.S.N.S.W. 1890, pp. 520, &c.) it falls under "EE" on p. 521, along with *C. gigantea*, Burm., from which it is very distinct by many characters—*inter alia* its nearly white color and the antennal flabellum of the male consisting of only three joints. The characters of the palpi in the male of course distinguish it from all the other described species of the genus.

Lake Callabonna ; taken by Mr. Zietz.

CALLABONICA (gen. nov. *Heteronycidarum).*

Mentum quadratum, tectiforme ; labrum (speciei typicæ) verticale supra clypeum sursum productum; antennæ (speciei typicæ) 8-articulatæ, flabello 3-articulato, articulis brevibus ; alæ obsoletæ ; cetera ut *Heteronycis.*

It seems impossible to refer the species for which I propose this name to any hitherto characterised genus ; its appendiculate claws aborted wings (which are only about half as long as the elytra) and remarkable mentum taken together render it easy of identification. The mentum is somewhat of the form known in geometry as a "triangular prism," being formed of two plane surfaces meeting down the middle line and sloping down from the middle line on either side, the extreme front also being sloped (or obliquely truncate) and representing I presume the ligula. Unfortunately there is not an example that can be devoted to dissection. The general appearance is that of a very short *Heteronyx*, with very convex elytra much rounded on their lateral outline. The genus is no doubt near *Pseudoheteronyx* but differs from it *inter alia* by the form of its mentum, by its wings not being altogether wanting, and by its longer metasternum (which however is somewhat shorter than in *Heteronyx).* It also bears some general resemblance to *Byrrhomorpha* from which however its appendiculate claws at once separate it. It is certainly incapable of flight, and no doubt is found (like *Pseudoheteronyx)* under stones.

C. propria, sp. nov. Nitida; nigra, antennis palpisque testaceis, pedibus rufescentibus; capite æqualiter confertim sat fortiter

ruguloso, prothorace elytrisque grosse sat crebre sat æqualiter (elytris quam prothorax paullo magis crebre), pygidio leviter squamose sat subtiliter, punctulatis ; corpore supra sparsim vix manifeste (capite magis crebre) fulvo-pubescenti, subtus pygidioque pilis erectis minus crebre vestitis ; clypeo antice late leviter emarginato ; hunc labro superanti ; prothorace quam longiori fere duplo latiori, antice vix angustato, angulis anticis acutis productis posticis obtusis, lateribus sat arcuatis; elytris haud striatis ; coxis posticis metasterno longitudine sat æquali ; tibiis anticis extus fortiter acute tridentatis ; tarsorum posticorum articulo 2° quam 1us duplo longiori. Long., 5½ l.; lat., 3—3½ l.

I do not find any notable sexual difference, but the proportionally wider specimen is probably a female.

Lake Callabonna ; taken by Mr. Zietz.

HETERONYX.

H. suturalis, sp. nov. Modice elongatus, sat convexus ; postice vix dilatatus ; sat nitidus ; ferrugineus, elytrorum sutura infuscata ; subtiliter minus crebre pubescens ; capite grosse subcrebre (clypeo magis crebre), prothorace sat sparsim sat fortiter, elytris squamose subtilius sat crebre, pygidio leviter sat grosse, punctulatis ; clypeo antice late levitere marginato, ante oculos minus dilatato, sutura clypeali subtili fere recta ; prothorace quam longiori fere duabus partibus (postice quam antice dimidia parte) latiori, lateribus sat arcuatis, basi leviter bisinuata, angulis anticis sat acutis vix productis posticis rotundato-obtusis ; elytris haud striatis, transversim minus manifeste rugatis ; tibiis anticis extus dentibus 2 (apicali incluso) acutis magnis (alioque parvo supra medium posito) armatis ; labro clypeum sat late superanti ; antennis 9-articulatis ; coxis posticis ad latera quam metasternum manifeste brevioribus, quam segmentum ventrale 2um paullo longioribus ; tarsis posticis modice elongatis, articulo 2° quam 1^{u} parum longiori ; unguiculis appendiculatis. Long., 3½ l. ; lat., 1⅘ l.

This species belongs to my "Group VII." of *Heteronyx* (vide P.L.S.N.S.W. 1889, p. 1219) which is tabulated in loc. cit. pp. 662, &c. In the tabulation it falls beside *H. vacuus*, Blackb., to which it is closely allied, differing however *inter alia* by its more strongly transverse and more coarsely punctulate prothorax, and the well-marked infuscation of its elytral suture.

Lake Callabonna ; taken by Mr. Zietz.

HYPHORYCTES (gen. nov. *Dynastidarum*).

Mentum hirsutum, sat elongatum, sat convexum, antice rotundatum ; palpi modici, articulo apicali elongato-ovali ; mandibulæ

externe bidentatæ (fere ut *Isodontis);* clypeus antrorsum angustatus, a capite sutura subtili angulata in medio tuberculo armata divisus; caput haud carina marginatum; prothorax æqualis; pedes breves crassissimi, tibiis anticis extus obtuse bidentatis (processu apicali excluso) posterioribus 4 transversim bicarinatis, tarsorum posticorum articulo basali fortiter ad apicem dilatato; processus prosternalis validus hirsutus; organa stridulationis nulla; maris tarsorum anticorum unguiculus externus crassus bifidus.

I cannot refer the species for which I propose this name to any existing genus, nor is it clear in which of his subtribes of *Dynastides* Lacordaire would have placed it, as the absence of sexual characters in the head and prothorax would associate it with subtribes in which the basal joint of the hind tarsi is of very different structure. It is generically very close to *Pentodon australis*, Blackb., but differs from it *inter alia* by the much more strongly dilated basal joint of its hind tarsi.

H. maculatus, sp. nov. Sat elongatus; minus nitidus; testaceo-rufus, suturis et carinis corporis pedumque fere omnibus et prothoracis utrinque macula laterali infuscatis; capite crebre subfortiter ruguloso, clypeo antice truncato leviter reflexo; prothorace quam longiori dimidia parte latiori, antice fortiter angustato, sparsim subtiliter (vix manifeste) punctulato, lateribus (superne visis) parum arcuatis; scutello magno lævi; elytris vix (vel nullo modo) striatis, obsolete seriatim punctulatis; pygidio antice crebre subtiliter postice vix manifeste punctulato. Long., 6—8 l.; lat., $3\frac{1}{2}$—5 l.

I have seen several examples of this insect; one of them has the elytra faintly striate with indications of about four obsolete costæ and some very faint but distinct punctures; in the other examples this sculpture is scarcely discernible; the difference is not sexual. I have no doubt they all appertain to one species.

Thursday Island; also Cape York.

NOVAPUS.

N. rugosicollis, Blackb. At the time when I described this species (Proc. Linn. Soc. N.S.W. 1890 p. 305) I was doubtful of the sex of the type but concluded with hesitation that it was a male. Subsequent examination of more recently acquired examples of the genus has satisfied me that it is a female. I have no doubt the male has a large excavation on the prothorax.

N. nitidus, sp. nov. Mas. Brevis; latus; nitidus; subtus sat dense rufo-hirsutus; piceo-rufus; capite cornu recurvo acuto armato; prothorace quam longiori fere duplo latiori, antice valde angustato, excavatione permagna a basi ad apicem extensa pernitida fere lævi impresso (hujus lateribus sursum

obtuse prominentibus), partibus lateralibus sat fortiter sat crebre punctulatis, lateribus fortiter rotundatis, angulis anticis sat acutis posticis obtusis, margine antico fere truncato, elytris fere lævibus. Long., 10½ l.; lat., 6 l.

A second example of this insect (in the collection of C. French, Esq.) is larger (long. 12 l.) and has the lateral parts of the prothorax a little less closely punctulate, but presents no other difference. The clypeus of this species as of the others of the genus known to me is somewhat narrowly produced forward in the middle, and the apex of the projection is rather strongly reflexed. This species may be at once distinguished from all the others of the genus that I have seen by its almost lævigate elytra which are marked only with a fine sutural stria two or three obsolete striæ (resembling faint wrinkles) and some very faintly impressed and distantly placed punctures.

N. Queensland.

N. bidentatus, sp. nov. Mas. Sat brevis; minus latus; sat nitidus; subtus sat dense rufo-hirsutus; rufus; capite cornu vix recurvo acuminato minus elongato armato; clypeo antice fere æqualiter rotundato, margine reflexo sat alte cincto; prothorace quam longiori vix dimidia parte latiori, antice valde angustato, excavatione permagna a basi ad apicem extensa fere lævi impresso (hujus lateribus sursum obtuse prominentibus), partibus lateralibus antice sparsissime punctulatis postice lævibus, lateribus rotundatis postice sinuatis, angulis anticis acutis posticis fere (nec acute) rectis, margine antico leviter fere æqualiter emarginato prope medium utrinque tuberculo parvo acuto armato; elytris striis nonnullis leviter impressis, his seriatim (interstitiis confuse) inæqualiter punctulatis. Long., 9 l.; lat., 5½ l.

The two small sharp tubercles placed one on either side of the middle of the front margin of the prothorax distinguish this species from all the others yet described of the genus.

Central Australia; McDonnell Ranges.

PSEUDORYCTES.

P. monstrosus, sp. nov. Mas. Nitidus; rufus, capite elytris pygidioque nigris; capite hirsuto antice perpendiculari, parte perpendiculari planato crasse ruguloso, cetera sparsim punctulato; antennarum flabello elongato, hujus articulis singulis quam articuli ceteri conjuncti manifeste longioribus; prothorace sparsim minus evidenter punctulato, sparsim hirsuto, spinis 3 perlongis (quam prothoracis latitudo sublongioribus) sat gracilibus armatis (ex his alio antico sinuato antrorsum et sursum oblique directo, aliis fere erectis utrinque paullo ante medium positis); scutello elytrisque

fere lævibus nitidissimis, his stria suturali fortiter impressis; corpore subtus dense hirsuto; pygidio fere glabro. Long., 9 l.; lat., $5\frac{1}{2}$ l.

This extraordinary species is instantly distinguishable from its described congeners by the remarkable armature of its prothorax which consists of three somewhat slender horns of about equal length, each of them about as long as the prothorax is wide. Its black head prothorax and pygidium are also notable. The perpendicular front of its head viewed from in front is flattened,—not concave as in that of *P. mullerianus*,—and is almost of semicircular shape, the chord of the semicircle (which however is slightly arched) forming its upper outline.

Gascoigne District, W. Australia; in the collection of Mr. French.

P. trifidus, sp. nov. Mas. Latus; sat nitidus; rufo-brunneus; capite antice perpendiculari, parte perpendiculari concavo; antennarum flabello elongato; hujus articulis singulis quam articuli ceteri conjuncti multo longioribus; prothorace sparsim subtiliter (parte excavata magis crasse) punctulato, cornubus 3 armatis (his quam prothoracis latitudo fere triplo brevioribus, cornu antico valde trifido, lateralibus crassissimis sed apicem versus sat gracilibus); scutello sparsim punctulato; elytris inæqualiter striatis, striis crebre sat fortiter punctulatis, interstitiis sparsim inæqualiter punctulatis; corpore subtus dense hirsuto; pygidio crebre (apicem versus sparsissime) punctulato. Long., 12 l.; lat., 7 l.

This species is easily recognisable by the armature of its prothorax; the front horn is directed forward over the head and turned upward at the apex which consists of three large triangular teeth (the middle one erect, the lateral ones directed outward on either side); the lateral horns are placed very widely apart and are erect but a little curved (so as to be convergent at their apices), and are extremely thick at their base but in their upper half become slender with almost pointed apices. The striation of the elytra is much better defined than in *P. mullerianus*, White.

Queensland; Darling R. district; in the collection of Mr. G. Masters.

HORONOTUS.

H. optatus, Shp. I have before me three male specimens forwarded by Mr. French evidently of this species. I should judge from the description of *H. variolicollis*, Fairm., that it is founded on the same species and must become a synonym. It seems also probable that my *Palmerstonia minor* is the female (which appears to have been unknown to both Sharp and Fairemaire) of

the same species. Whether the Australian species referred by Sharp and Fairemaire to this Indian genus *Horonotus* are satisfactorily placed there or are better regarded as generically distinct (in which case my name *Palmerstonia* will stand) I am not in a position to determine positively, as I have not an example of any Indian species for comparison, but it may be noted that according to Burmeister (the author of the genus) and Lacordaire, one of the generic characters of *Horonotus* consists in the prothorax being armed with an excavation and also one or more prominences in both sexes. In my *Palmerstonia* and in the only Australian species attributed to *Horonotus* of which the female is known *(H. duplex*, Shp.) the prothorax of the female is quite even; this appears to me to be an important character and to render justifiable the use of a distinctive generic name.

SEMANOPTERUS.

S. rectangulus, sp. nov. Ovalis; sat latus; nitidus; piceus, capite prothoraceque nigris, antennarum clava rufescenti; subtus longe sat dense rufo-pilosus; capite transversim rugato tuberculo conico inter oculos armato; prothorace quam longiori plus quam dimidio latiori, minus crebre (in medio obsolete, sed in depressione crasse squamose) punctulato, antice angustato, lateribus sat fortiter rotundatis mox ante basin subito fortiter incurvis hinc ad basin (superne visis) rectis, angulis anticis sat prominulis posticis acute rectis; elytris 4 costatis (costa suturali inclusa), interstitiis sat crasse nec crebre nec profunde punctulatis; tibiis anticis extus fortiter (maris quam feminæ magis acute) tridentatis; segmento ventrali 6° punctulato, postice vitta transversali lævi marginato; processu prosternali angusto carinato.

Maris prothorace antice fossa magna rotundata profunda, postice sulco longitudinali in medio dilatato, impresso; segmento 6° ventrali postice emarginato.

Feminæ prothorace longitudinaliter sulcato, sulco et ante et pone medium dilatato; segmento ventrali 6° simplici. Long., 7 l.; lat., 4 l.

It is extremely difficult to arrive at any satisfactory conclusion as to the limits of species in this most perplexing genus; specimens taken in company and certainly seeming to be of but one species vary considerably in the puncturation of the upper surface (especially in the distinctness of the prothoracic punctures and in the extent to which the punctures of the elytral interstices invade the edges of the costæ) and even in the width of the prothorax. The insect described above is however easily recognisable by the peculiar outline of the prothorax which is very suddenly and strongly contracted a little in front of the

base and thence (viewed from above) quite parallel hindward, the hind angles being sharply rectangular (almost dentiform). The shape of the prosternal process also calls for attention. This in the genus *Semanopterus* rises perpendicularly behind the coxæ and its summit is bent forward so as to project slightly between the coxæ towards the head. In the present species it is densely clothed with long setæ and is considerably narrower than in some species of the genus; its perpendicular face is strongly convex,—almost cariniform,—and its forward bend is only slight, the bent-forward part being quite narrow and almost evenly continuing the curve and convexity of the perpendicular part. In some species the bent-forward part is much wider flatter and almost at a right angle to the perpendicular part.

Alice Springs, Oodnadatta, Leigh's Creek and Barrow's Creek.

S. persimilis, sp. nov. Ovalis; sat latus; nitidus; piceo-niger, subtus obscure rufescens longe sat dense rufo-pilosus; capite crasse squamose ruguloso, tuberculo conico inter oculos armato; prothorace quam longiori dimidio latiori sat crebre sat fortiter (in depressione crasse squamose) punctulato, antice angustato, lateribus sat fortiter rotundatis mox ante basin subito fortiter incurvis hinc ad basin (superne visis) rectis, angulis anticis sat prominulis posticis acute rectis; elytris 4-costatis (costa suturali inclusa), interstitiis sat crasse nec crebre nec profunde punctulatis; tibiis anticis extus valde fortiter (maris quam feminæ etiam magis fortiter) tridentatis; segmento ventrali 6° punctulato, postice vitta transversali lævi marginato; processu prosternali sat angusto carinato, parte summa antrorsum directa minute planata et antrorsum deelivi.

Maris prothorace antice fossa magna rotundata profunda, postice sulco longitudinali, impresso; segmento 6° ventrali postice emarginato.

Feminæ prothorace longitudinaliter sulcato, sulco et ante et pone medium dilatato; segmento ventrali 6° simplici. Long., 7—8 l.; lat., 4—4$\frac{2}{5}$ l.

This species is very closely allied to *S. rectangulus*, Blackb., from which it differs by the nearly black color of its upper surface, the evidently stronger puncturation of its prothorax, the larger teeth on the external margin of its front tibiæ, the more confused sculpture of its clypeus and the different shape of its prosternal process. This latter (as in *rectangulus)* consists of an erect somewhat narrow piece keeled on its hind face rising from the surface of the prosternum behind the coxæ and at its summit bent forward slightly towards the head; but whereas in *rectangulus* this bending forward is the result merely of the top

of the process being slightly curved, in *persimilis* a small flattish lamina appears to jut out (from the top of the process) directed towards the head and also sloping downwards, so that from a certain point of view *(i.e.* from the side) the top of the process seems to be obliquely truncate with its point furthest from the head subtuberculiform. The process (as in *rectangulus)* is densely hirsute but in this species the front part of the flattened top is glabrous. This species is distinguished from all the recognisably described *Semanopteri* (except *rectangulus)* by the peculiar outline of its prothorax which (viewed from above) looks as if a small piece had been cut-out on either side close to the base.

N. Queensland; sent by Mr. French.

S. dentatus, sp. nov. Late ovalis; minus convexus; nitidus; piceo-niger, subtus vix rufescens, rufopilosus; capite crasse squamose nec profunde ruguloso, tuberculo magno armato, pone tuberculum fossa lævi impresso; prothorace quam longiori plus quam dimidio latiori, subgrosse minus crebre nec profunde (in depressione et versus angulos anticos crasse squamose) punctulato, antice angustato, margine antico in medio leviter elevato, lateribus sat rotundatis, angulis anticis sat prominulis posticis (superne visis) rectis (haud acute); elytris minus æqualiter sat crasse leviter punctulato-striatis, vix manifeste costatis, puncturis striarum et interstitiorum nonnihil confusis; tibiis anticis extus fortiter tridentatis; abdomine sparsim leviter squamose punctulato; processu prosternali minus angusto, retrorsum fortiter bidentato.

Mas latet.

Feminæ prothorace antice fossa rotundata, postice sulco longitudinali obsoleto, impresso. Long., 11 l.; lat., 6 l. (vix).

The remarkable form of the prosternal process at once separates this species from its described congeners. The process may be described as rising upwards from the level of the prosternum behind the coxæ, but instead of rising erectly it inclines forward, and its hinder face bears two large transverse blunt teeth or tubercles (one below the other) and is nearly glabrous. The nitid depression on the head behind the tubercle is also very distinctive. As the apical ventral segment is not emarginate I presume the example before me is a female. The prosternum *in front* of the coxæ is somewhat wide, with a strong median keel.

N. Queensland.

S. carinatus, sp. nov. *S. persimili* valde affinis; differt dentibus tibiarum anticarum minoribus, tarsorum posticorum articulo basali ad apicem minus lato, processu prosternali ad summum sat longe horizontali anguste cariniformi, nec tuberculato. Long., 7 l.; lat., 4 l.

This species is extremely like *S. rectangulus*, Blackb., and *S. persimilis*, Blackb., but differs from both by characters that appear to me quite inconsistent with specific identity. The most notable of these is the form of the prosternal process, which at the top is bent forward towards the head in such fashion that its bent-forward portion almost forms a right angle with its erect portion,—but this (*i.e.*, the bent-forward portion) instead of being a small flattish lamina bounded posteriorly by a tubercle (as it is in *persimilis)* is a narrow keel (its outline viewed from the side being seen however to be slightly concave) ; while in *rectangulus* the bent-forward portion is scarcely existent being represented merely by the erect portion being slightly curved towards the head at its summit. The prosternum *in front of* the coxæ is in all these three species narrow and roundly cariniform. The puncturation of the prothorax is in this species almost as in *rectangulus* but the sulcus of the hind part of the prothorax is simple as in *persimilis* (not dilated in its middle into a fovea as it is in *rectangulus*).

Northern Territory of South Australia ; near Palmerston.

N.B.—The species of *Semanopterus* named previously to those I have described are *S. (Phileurus) subcostatus*, Cast., *S. Adelaidæ*, *subæqualis* and *depressus*, Hope, and *S. convexiusculus* and *depressiusculus*, Macl. None of them are described sufficiently for confident identification and it is possible that I may have described some of them, especially the first,—the description of which would apply so far as it goes to any *Semanopterus*. I, however, have species in my collection which seem likely to be *Adelaidæ*, *subæqualis*, and *convexiusculus* and are certainly distinct from those I have described. I should judge from their names that *S. depressus* and *depressiusculus* cannot be identical with any of my species unless it be *S. dentatus*,—but they are both described as having costate elytra, while *dentatus* is of all the *Semanopteri* known to me the only one on which no clearly defined elytral costæ can be traced.

ISCHIOPSOPHA.

I. Bourkei, sp. nov. Nitidissimus ; læte viridis (vel certo adspectu cœruleus), antennis palpisque piceis plus minusve viridi-micantibus, abdominis suturis parte mediana maculisque lateralibus certo adspectu nigricantibus ; supra tota creberrime omnium subtillissime coriacea ; capite sparsius subtilius punctulato, clypeo profunde bifido ; prothorace (lobo basali excepto) quam longiori (et postice quam antice) duplo latiori, latera versus leviter sparsim (in disco vix manifeste) quam caput multo minus fortiter punctulato, lobo basali magno scutellum fere obtegenti ad apicem emar-

ginato ; elytris lævibus nisi juxta marginem lateralem transversim strigatis, sutura postice carinata et ad apicem spinoso-producta ; pygidio concentrice sat fortiter strigato ; subtus sublævis vel potius obsolete sparsissime punctulata, segmentis ventralibus singulis utrinque spatio crebre oblique strigato ornatis ; processu mesosternali elongato sat horizontali.

Maris capite elongato, tibiis anticis extus (processu apicali excepto) dente minuto subapicali (et altero submediano haud vel vix manifesto) armatis ; abdomine longitudinaliter concavo.

Feminæ capite minus elongato, tibiis anticis extus dentibus 3 (apicali incluso) sat fortibus armatis ; abdomine sat æqualiter convexo, segmento 5° postice puncturis nonnullis sat magnis impressis. Long., 13 l.; lat., $6\frac{1}{2}$.

I cannot find among the numerous species of *Ischiopsopha* described (some of them as *Lomapterœ)* as occurring in New Guinea and Malay that this large and magnificent insect has a place. Compared with *I. (Lomaptera) pulchripes*, Thoms., the present species is larger and of a more robust build,—differently colored, its green tending towards blue whereas that of *pulchripes* tends towards golden,—its head is very similar except more finely sparsely and faintly punctured, especially in the hinder part,—its prothorax is much more strongly transverse, devoid of transverse strigosity, and very much less strongly punctured (the punctures even close to the lateral margin being very sparse and scarcely so strongly impressed as those halfway between the middle of the prothorax and the lateral margin in *pulchripes)*,—its elytra are practically punctureless (in the female the punctures where most distinct are scarcely so much so as in the middle of the prothorax of *pulchripes*, in the male they are still fainter) their sutural apex is more prominent, and their system of submarginal transverse scratches is almost exactly as in *Hemipharis insularis*, L. and G.,—its legs are very differently colored,—its whole surface under a strong lens is seen to be finely coriaceous or covered evenly with a system of excessively close and fine puncturation underlying all the other sculpture. The bluish tone of color is more marked in the males than females.

N. Queensland ; taken by Captain Edmund Bourke, R.N., and presented to me.

ASTRÆUS.

A. Meyricki, Blackb. I see that Herr. van de Poll in Tijdsckr. ent. xxxvi., p. 67, says that this name has been given to the same species as that which he called *A. Badeni*. I have already (Proc. L.S., N.S.W., 1894, p. 101) drawn attention to the facts that

Herr van de Poll and I both described some Australian *Astræi* in 1889, that his descriptions seem to have been published before mine, and that probably his *A. Jansoni* and my *A. Tepperi* are names of one and the same species. When writing that note I considered the question whether *Meyricki* and *Badeni* are identical and considered it doubtful, an opinion I still hold. Herr van de Poll gives as the first-named habitat of *A. Badeni* "Gawler, S.A.," and adds as a second locality "Swan River." I doubt whether any *Astræus* is common to these very distant localities, and if the type of *A. Badeni* really came from Gawler I should expect to find it different from *A. Meyricki* which is from N.W. Australia. No doubt the two species are at any rate much like each other, but I notice that *A. Badeni* as figured has the basal spot of its elytra extending across two interstices while in *A. Meyricki* it seems to be constantly limited to one interstice,—nor do I find any trace in *Meyricki* of the fine red line which is depicted across the basal margin of the elytra in *Badeni*. On these grounds I look upon it as quite likely that if the types of the two could be compared other differences would be found.

BUBASTES.

B. splendens, Blackb. The *Coleoptera* collected at L. Callabonna by Mr. Zietz include what I take to be a second specimen of this insect. It is notably smaller than the type with elytra tending towards violet in color and the puncturation throughout seems to be a trifle less strong but, judging from the extreme variability of its congener *B. inconsistens*, Thoms., these differences are unlikely to be specific.

CHRYSOBOTHRIS.

C. interioris, sp. nov. Obscure ænea, hic illic cuprascens, elytrorum foveis sat læte cupreis; capite antice sat crasse ruguloso-punctulato et transversim inæquali, postice crebre subtilius punctulato (in medio lævi et canaliculato), oculis minus approximatis; prothorace quam longiori duabus partibus latiori, leviter canaliculato (canali antice obsoleto), crebre subtilius transversim rugato et sat crebre punctulato, antice et postice æqualiter angustato, inæquali (præsertim utrinque oblique leviter impresso), lateribus (superne visis) in parte mediana rectis vel fere concavis hinc et antice et postice angulatim convergentibus, basi valde trisinuata; elytris crebre subtilius punctulatis, costis discoidalibus 4 et costa abbreviata subscutellari instructis, foveis 3 impressis, lateribus denticulatis fere ab humero, apice obtuso; corpore subtus in parte mediana sparsim (latera versus sat crebre) punctulato, puncturis a parte antica retrorsum gradatim

minus fortiter impressis; prosterni margine antico late emarginato; segmento apicali ventrali 2-emarginato et 3-spinoso. Long., $6\frac{3}{4}$ l.; lat., $2\frac{3}{5}$ l.

The eyes are wider apart than in most *Chrysobothres* known to me. The prothorax is of peculiar form (the form probably that M. Thomson calls "subhexagonalis"), approximated however though only feebly by one or two other species in my collection; the middle part of its sides is slightly concave and at the front and hind apices of this middle part the outline is very distinctly angulated and thence proceeds obliquely to the comparatively narrow front and hind margins respectively, so that the segment is quite decidedly "octagonal" (except in so far as its regularity is marred by the trisinuation of the base). Another well-marked character is afforded by the hind outline of the apical ventral segment which is widely emarginate, either side of the emargination being produced in a strong spine, while the longitudinal carina that runs down the segment is produced hindward (dividing the emargination into two) in a third spine very little shorter than the lateral ones. I am unfortunately not able to detail the differences between this species and any other described Australian *Chrysobothris* as there is not one of those hitherto named that has been recognisably described. I have in my collection examples (conjecturally identified) of most of them but it is of no use to compare a new species with an old one unless one is quite certain of the latter. Limiting myself to the characters mentioned in the descriptions I may say however that the 3-spinose apex of its abdomen distinguishes this insect from *C. subsimilis*, Thoms., and *amplicollis*, Thoms., and that the strong oblique lateral impressions of its prothorax distinguish it from *C. Mastersi*, Macl., and *viridis*, Macl. The other species are practically undescribed, although it may be noted that Mr. Saunders' re-description of *C. Australasiæ*, Hope, seems to imply that the apex of its abdomen is not tri-spinose; their localities however are such as to render extremely improbable their identity with this Central Australian species. The elytral costæ of the present insect are very well defined and are placed as in the other Australian species; the foveæ are placed as follows,—one close to the middle of the base, one in front of the middle between the second and third costæ, one behind the middle interrupting the third costa. The front femora are strongly dentate beneath, the intermediate tibiæ nearly straight. The basal two ventral segments are shallowly concave longitudinally.

Lake Callabonna; taken by Mr. Zietz.

AGRYPNUS.

A. Mastersi, Macl. Specimens of *Agrypnus* taken by Mr. Zietz near Lake Callabonna vary from the type prevalent in N.

Queensland to an extent that seems scarcely consistent with specific identity,—the prothorax being very much more finely punctulate and having its sides much more sinuate behind the middle. Nevertheless as that eminent specialist Dr. Candéze has stated his opinion, after examining a long series of *Agrypni* from various parts of Australia, that he has seen only one species and that it is an extremely variable one, I deem it better to abstain from treating these Central Australian specimens as specifically distinct from *Mastersi*.

LACON.

L. Zietzi, sp. nov. Piceus; minus nitidus; squamulis piliformibus griseis vestitus (his in elytrorum interstitiis alternis paullo densioribus), antennis pedibusque rufescentibus; prothorace quam longiori vix latiori, crebre subfortiter punctulato, canaliculato (canali antice obsoleto), a basi ad apicem gradatim (leviter sinuatim) angustato, basi quam margo anticus duplo latiori, angulis posticis obtusis extus paullo dilatatis; elytris quam prothorax parum latioribus, punctulato-striatis, interstitiis subfortiter punctulatis inter se æqualibus; sulcis tarsorum nullis. Long., 5 l.; lat., $1\frac{3}{5}$ l.

The slightly denser disposition of the vestiture on the alternate interstices of the elytra than on the others,—which is more apparent in some examples than in others,—gives this species a faint appearance of being striped and renders it a little doubtful whether Dr. Candéze would place it in his tabulation (Mém. Liége (2) IX., 1882, pp. 49, &c.) among the unicolorous or the variegated species. Among the former it would stand beside *L. princeps*, Cand., and *crassus*, Cand., from which its size and the posterior angles of its prothorax not truncate readily distinguish it,—while among the variegated species it would be at once distinguished by the absence of tarsal sulci. It should be noted that although careful measurement shows the prothorax to be a trifle wider than long, that segment to a casual glance appears longer than wide.

Lake Callabonna; taken by Mr. Zietz.

MONOCREPIDIUS.

M. commodus, sp. nov. Modice angustus; sat parallelus; minus nitidus; pube fulva vestitus; totus ferrugineus, antennis pedibusque dilutioribus, scutello elytrorumque basi rufescentibus; antennarum articulo 3° quam 2us parum longiori, quam 5us duplo breviori; prothorace trans angulos posticos quam longiori vix latiori, subtiliter manifeste canaliculato (nonnullorum exemplorum canali antice posticeque abbreviato), sat crebre minus subtiliter umbilicato-punctulato, angulis posticis divergentibus, bicarinatis (carina interna

brevi minus perspicua); elytris ad apicem sat rotundatis nonnullorum exemplorum angulo suturali brevissime acuto), punctulato-striatis, interstitiis leviter convexis crebre subaspere punctulatis; prosterno medio fortiter gibbo, fortius vix crebre punctulato, hoc ad latera haud deplanato, suturis prosternalibus rectis, pronoti margine antico in prosternum deflexo; tarsorum lamella sat angusta.

Maris antennis prothoracis basin sat longe superantibus; prothorace a basi ad apicem sinuatim angustato.

Feminæ antennis prothoracis basin vix attingentibus; prothorace ad medium quam trans basin parum angustiori. Long., $6\frac{1}{2}$—$7\frac{1}{2}$ l.; lat., $1\frac{4}{5}$—$2\frac{1}{5}$ l.

The Australian species of *Monocrepidius* may be best subdivided, in my opinion, by the structure of the lateral margin of the pronotum and prosternum which assumes three different forms. In some species (*e.g.*, *Australasiæ*, Boisd.) it is strictly lateral; in others (*e.g.*, *acuminatus*, Macl.) it is deflexed in front so that (viewed from directly above) the front part of it passes out of sight and both margins can be seen together in their entirety only by turning the specimen upside down and looking at them on the prosternum, but in other respects it is as in the former group; in a third group of species (*e.g.*, *nigripennis*, Cand.) it passes on to the prosternum behind the middle of the segment (so that the greater part of it is invisible when the pronotum is viewed from directly above) and is bordered on the prosternum by a well-defined sulcus (these species mimicking some *Eucnemidæ* in their structure.

The present species belongs to the second of these groups, and is distinguishable by exceptionally good characters, among which the most noticeable are the remarkably convex—strongly protuberant—middle part of its prosternum, and the umbilicated punctures of its prothorax (inside each of which there appears to be a small granule).

Lake Callabonna; taken by Mr. Zietz.

M. inamœnus, sp. nov. Modice angustus; sat parallelus; minus nitidus; pube fulva vestitus; supra obscure brunneus, corpore subtus ferrugineo, antennis palpis pedibusque testaceis; capite postice longitudinaliter carinato; antennarum articulo 3° quam 2us vix longiori, quam 5us duplo breviori; prothorace trans angulos posticos quam longiori subangustiori, leviter canaliculato (canali antice sat obsoleto), confertissime vix aspere punctulato, angulis posticis parum divergentibus bicarinatis (carina interna sat forti minus abbreviata); elytris ad apicem sat rotundatis (angulo suturali brevissime acuto), punctulato-striatis, interstitiis leviter convexis sub-

tiliter transversim rugatis; prosterno medio fortius vix crebre punctulato, hoc ad latera sulcato, suturis prosternalibus rectis, pronoti margine in prosternum deflexo; tarsorum lamella angusta.

Maris antennis prothoracis basin vix superantibus; prothorace a basi ad apicem sinuatim angustato.

Feminæ antennis prothoracis basin haud attingentibus; prothorace ad medium quam trans basin parum angustiori. Long., 5—5½ l.; lat., 1⅗ l.

This species belongs to the third of the groups that I have suggested above as convenient subdivisions of *Monocrepidius*. It is remarkable for the extremely close puncturation of its prothorax. It may be noted that the piece of the prosternum included between the prosternal suture and the margin of the pronotum is (not as in some species acuminate, but) obliquely truncate in front. In Dr. Candéze's tabulation of *Monocrepidius* (Mon. II. pp. 191, &c.) the present species would stand beside *M. fictus*, Cand., from which *inter alia* its considerably larger size will distinguish it.

Lake Callabonna; taken by Mr. Zietz.

APHILEUS.

A. ferox, sp. nov. Sat latus; sat depressus; fusco-piceus, palpis antennis pedibusque testaceis vel piceo-testaceis; breviter cinereo-setulosus; mandibulis elongatis, quam caput (labro excluso) sat longioribus, curvatis, ad apicem acutis (haud bidentatis), pone medium intus dente valde elongato armatis; capite sat nitido inter oculos concavo, sat crebre punctulato; prothorace sat nitido, quam longiori tribus partibus latiori, obsolete canaliculato, sat crebre (ad latera fere ut caput, in medio paullo minus crebre) punctulato, trans basin quam trans marginem anticum plus quam dimidia parte latiori, subquadrato (sed lateribus versus apicem summum fortiter convergentibus, versus basin summam fortiter divergentibus), lateribus distincte explanatis sed vix manifeste marginatis, angulis posticis divergentibus; elytris striatis, striis subtilius punctulatis, interstitiis parum convexis obsolete rugulosis, apice suturali breviter spiniformi. Long. (mands. incl.), 18 l.; lat., 5⅘ l.

Larger than *A. lucanoides* and less widely shaped; differs from that species also *inter alia* by its very distinct mandibles and its more nitid prothorax with much closer puncturation. In the example before me there is a very conspicuous tubercle on the disc of the prothorax a little to the left of the central line, but in all probability this is an individual aberration.

N. Queensland; presented to me by Mr. French.

LAIUS.

L. eremita, sp. nov. Subopacus; haud setosus; coccineus, antennis nigris, elytrorum maculis binis (his marginem lateralem nec suturam attingentibus, altera minori basali altera majori subapicali) piceis, pedibus infuscatis; capite elytrisque (his sat brevibus) creberrime rugulosis vel potius coriaceis; prothorace valde transverso, inæquali, subnitido, puncturis sat magnis leviter impressis; oculis fortiter convexis.

Maris antennarum articulo 2° valde compresso-dilatato, obovato, ad apicem subtruncato; capite trans oculos quam prothorax fere latiori. Femina latet.

Long., $1\frac{4}{5}$ l.; lat., $\frac{7}{10}$ l.

A very distinct species owing to the uniform red color of its body with the exception of the two dark spots on the elytra; its unicolorous black antennæ are also characteristic.

Central Australia; near Oodnadatta.

PTEROHELÆUS.

P. fraternus, sp. nov. Late ovalis; sat nitidus; piceus antennis tarsisque dilutioribus; capite subtiliter obsolete minus crebre punctulato; prothorace fere lævigato, quam longiori (et postice quam antice) fere triplo latiori, ad latera late explanato, marginibus lateralibus vix recurvis, angulis anticis obtusis sat productis posticis sat acutis, basi sat fortiter trisinuata; elytris subtiliter seriatim punctulatis, vix striatis, ad latera late explanatis, margine explanato ante medium intus dilatato apicem versus angustiori. Long., 7 l.; lat., $4\frac{1}{2}$ l.

This species in its broad form with wide lateral margins of prothorax and elytra resembles *P. piceus*, Kirby, near which it should be placed in the first group of the genus as subdivided by Sir W. Macleay (P.L.S., N.S.W., 1887, p. 520). Its comparatively small size will distinguish it from all the other members of that group. Placed beside *P. piceus* it differs from the latter chiefly by its head and prothorax being even less distinctly punctured and its elytral sculpture consisting of mere rows of fine punctures becoming very faint near the apex, the interstices between which are perfectly flat; while the elytra of *piceus* are distinctly punctulate-striate with distinctly convex interstices.

Central Australia; in my collection; specimens taken by Mr. Zietz near Lake Callabonna scarcely differ.

HELÆUS.

H. interioris, Macl. Among the *Coleoptera* brought from Lake Callabonna by Mr. Zietz are a series of specimens which I attribute to this species, although Sir W. Macleay's description

is not of a kind to justify very great certainty. Unfortunately Sir William in his descriptions of *Helœi* has relied as a principal character on the number of granules on the elytra and this undoubtedly appears to be subject to much variety. I am convinced that the series before me cannot be regarded as representing more than one species, but there are scarcely two of them in which the elytra are identically granulate. I think them likely to be *H. interioris* because, although the description of that species mentions scarcely a character that is really specific, they all have near the suture a row of granules closer and more conspicuous than those in the other rows (and more markedly so than in most other *Helœi*) and this character is mentioned in Sir W. Macleay's description of *H. interioris*. The reliable characters of the insect before me seem to consist in its comparatively narrow elongate form and the strongly "turned up" direction of the expanded sides of the elytra. It is quite true that Sir W. Macleay calls the "margin" "a *little* reflexed" but a comparison of the terms he uses in describing other species points to the conclusion of his intending to signify that the expanded margin in *H. interioris* is more reflexed than in most other *Helœi*.

EPHIDONIUS.

E. parvicollis, sp. nov. Ovalis; opacus; niger; corpore subtus picescenti; capite creberrime subtilius subaspere (puncturis majoribus minoribus que intermixtis) punctulato; prothorace quam caput dimidia parte latiori quam elytris fere duplo angustiori, quam longiori (et postice quam antice) dimidia parte latiori, postice utrinque sulco obliquo obsolete impresso (his ambobus literam V obscure simulantibus), creberrime subtilissime punctulato (vel potius coriaceo) et puncturis paullo majoribus sparsim impresso, lateribus sat explanatis et leviter recurvis, angulis anticis obtusis posticis acute rectis vix retrorsum directis; elytris quam prothorax quadruplo longioribus, costis quinis (sutura inclusa) ornatis, inter costam et costam puncturarum seriebus 4 impressis (serierum interstitiis leviter convexis); labro antice vix emarginato; maris a feminæ tibiis haud distinctis. Long., 9 l.; lat., $4\frac{3}{5}$ l.

This species seems to be near *E. Duboulayi*, Bates, but differing in several respects,—in its entirely opaque upper surface (Mr. Bates implies that *Duboulayi* is not more opaque than *acuticornis)*, its scarcely emarginate labrum, the close puncturation of its head, the simple tibiæ of the male, &c. The elytral costæ under a strong lens show the same minute tuberculation continued behind (where the costæ become very faint) as Mr. Bates describes in *E. Duboulayi*.

Lake Callabonna; taken by Mr. Zietz.

CISTELIDÆ.

HOMOTRYSIS.

H. arida, sp. nov. Fem. Sat elongata; leviter ovata; minus convexa; nitida; pilis elongatis erectis sat crebre vestita; rufobrunnea, capite postice prothoraceque picescentibus, antennis palpis pedibus labro (et clypeo antice), rufo-testaceis; capite (cum prothorace) dupliciter (subtiliter et sat fortiter) sat crebre confuse punctulato; oculis minus convexis distantibus (spatio intermedio quam antennarum articuli 3^{i} longitudo sat latiori); prothorace quam longiori parum latiori, haud canaliculato (disco utrinque vix impresso), antice modice angustato, lateribus leviter sat æqualiter (superne visis) arcuatis, basi sinuatim truncata, angulis posticis obtuse rectis (superne visis obtusis); scutello punctulato, in medio leviter carinato; elytris sat fortiter striatis, striis punctulatis (puncturis antice magnis quadratis, retrorsum gradatim obsoletescentibus), interstitiis sat planis fortius minus crebre punctulatis; antennis quam corporis dimidium paullo brevioribus, articulo 3° quam 4us manifeste longiori; segmento ventrali apicali æquali, postice rotundato-truncato. Long., 5$\frac{4}{5}$ l.; lat., 2 l.

The principal characters of this species,—among its congeners with longish erect pilosity clothing the upper surface,—lie in its feebly convex eyes, exceptionally elongate prothorax, nearly uniformly colored upper surface, and elytra with both striæ (these however only in front) and interstices conspicuously punctulate.

Central Australia; near Oodnadatta.

H. sitiens, sp. nov. Fem. Præcedenti affinis; tota picea, labro antennis pedibusque paullo dilutioribus; capite (clypeo excepto) sparsim subtilius punctulato; prothorace quam longiori fere dimidia parte latiori, ad latera sat fortiter rotundato, minus fortiter punctulato, in disco (exempli typici) haud impresso, antice vix angustato, angulis posticis magis rotundatis; scutello medio nullo modo carinato; antennarum subtiliorum magis elongatarum articulo 3° quam 4us magis longiori; cetera ut præcedentis *(H. aridæ)*. Long., 5 l.; lat., 1$\frac{3}{5}$ l.

Closely allied to *H. arida*, but differing from it by well defined characters,—especially by its antennæ and legs of dark color, the third joint of its antennæ longer in proportion to the fourth, its prothorax much more transverse and otherwise differently shaped, &c.

Central Australia; Hergott Springs.

H. callabonensis, sp. nov. *H. aridæ* affinis; differt fere ut *H. sitiens* sed colore et capitis sculptura *H. aridæ* haud dis-

pari; prothorace minus crebre vix dupliciter punctulato; elytrorum versus apicem striis magis perspicue punctulatis interstitiis manifeste convexis angustatis.

Maris tibiis anticis (paullo supra medium) dente valido armatis. Feminæ tibiis muticis. Long., $4\frac{1}{2}$—5 l.; lat., $1\frac{1}{2}$—$1\frac{3}{5}$ l.

This species is closely allied to the preceding two. I should hesitate to consider its differences more than accidental peculiarities of an individual if I had seen only a single example, but I have before me several of each sex in all of which the distinctive characters are quite constant. *H. arida* may be at once distinguished from the other two by its considerably more elongate and less transverse prothorax arched on the sides only feebly. *H. sitiens* differs from the other two by the dark color of its antennæ and legs as well as by the sparseness of the punctures between its eyes and from *arida* by its more slender antennæ with comparatively longer third joint,—while *H. callabonensis* differs from the other two by the finer punctures of the prothorax being almost absent by the striæ of its elytra being quite conspicuously punctulate to the apex and by its elytral interstices becoming narrower and quite evidently convex near the apex.

Central Australia; taken near Lake Callabonna by Mr. Zietz.

N.B.—In my tabulation of species of *Homotrysis* (Tr. Roy. Soc. S.A. 1891 pp. 320-1) the three above described would form a separate section under "AA" on page 321 (assuming, that is, that the eyes of the male,—as is probably the case,—are not materially different in *H. arida* and *sitiens* from those of *H. callabonensis*). The tabulation then will end as follows:—

AA. Interval between eyes in both sexes greater than the width of either eye as seen from above.
  B. Punctures of elytral striæ,—at least in front half of elytra,—well defined, and quite distinct from the much smaller interstitial punctures.
    C. Head strongly and rather closely punctulate between the eyes.
      D. Coarser punctures of prothorax much confused with fine puncturation ... ... *arida*, Blackb.
      DD. Prothorax almost devoid of fine punctures ... ... *callabonensis*, Blackb.
    CC. Punctures between the eyes very fine and very sparse... *sitiens*, Blackb.
  BB. Punctures of elytral striæ scarcely defined as distinct from those of the interstices... *carbonaria*, Germ.

NOCAR.

N. debilis, Blackb. This species is identical with *Cistela depressiuscula*, Macl., an example of which I have to thank Mr. Mr. Masters for. As mine is the more recent name it must sink and the insect must be known as *Nocar depressiusculus*, Macl.

ŒDEMERIDÆ.

ANANCA.

This genus is already a receptacle for widely different forms and is only waiting its time to undergo a revision which will probably involve the removal from it of all the Australian species attributed to it. Mr. Champion of the London Entomological Society (who ranks high among the specialists of our day on the *Heteromera* and to whom I am indebted for much valuable assistance in working on the family) has the Australian *Œdemeridæ* at present in hand, and I understand is about dealing with them in a memoir which I anticipate with the deepest interest. Under these circumstances it would be out of the question even if I felt competent for the task for me to meddle with it. In the Zietz collection, however, there is a species of *Œdemeridæ* which it seems very inconvenient to omit in my present work of describing the new species of that collection and as it seems quite safe to assume that the species in question is not among those in Mr. Champion's hands I venture to subjoin a description of it. In describing it the only existing genus to which it can be provisionally referred is *Ananca*. It certainly has much resemblance to some of the Australian species that bear the name *Ananca* but I doubt whether it will stand permanently as really congeneric with any of them. Its very much smaller size at once suggests wide departure from such species as *Œdemera puncta*, W. S. Macleay, *Œ. australis*, Boisd., *Nacerdes nigronotata*, Bohem., which may be regarded as fair types of the Australian insects that have been attributed to *Ananca*. These latter species however differ much *inter se* in the structure of their palpi and tarsi, —so much indeed that the three I have named may possibly be held to represent three distinct genera. The species I describe below could not, in that case, be associated with any of those three. Of them I think *nigronotata*, Boh., is the one it comes nearest to but it differs from it in notable characters, especially in its much shorter muzzle, in its smaller and much more slender tarsi, in its shorter maxillary palpi the apical joint of which is less securiform, in its shorter legs, and in its prothorax not much narrower than its elytra. Its eyes are much like those of *nigronotata* and its front tibiæ have two apical spines.

A. Zietzi, sp. nov. Testaceo-fusca, sternis abdomineque nigri-

cantibus exceptis; sat nitida; minus dense pubescens; antennis quam corporis dimidium brevioribus; capite crebre distincte, prothorace vix manifeste (hoc quam longiori parum latiori, in medio transversim inæquali, lateribus antice sat rotundatis), elytris subtilius sat crebre, punctulatis; his lineis subtiliter elevatis circiter 3 vix distincte instructis. Long., $3\frac{1}{2}$—4 l.; lat., 1 l.

Lake Callabonna; taken by Mr. Zietz.

CURCULIONIDÆ.

TALAURINUS.

T. strangulatus, sp. nov. Niger, squamis pallidis plus minusve vestitus et in tuberculis omnibus setis singulis pallidis instructus; capite coriaceo vix manifeste punctulato; rostro brevi quam caput paullo angustiori, fortiter concavo, ad apicem emarginato, carinis internis vix distinctis externis crassis minus obliquis bene determinatis obsolete grosse punctulatis; prothorace quam longiori parum latiori, mox pone marginem anticum profunde transversim sulcato, sparsim tuberculato, antice quam trans basin paullo latiori, lateribus sat arcuatis; elytris tuberculis parvis nitidis subseriatim instructis, angulis humeralibus tuberculiformibus sed vix antrorsum prominentibus; tibiis elongatis gracilibus.

Maris femoribus anticis sat dilatatis; segmento ventrali apicali pone medium transversim leviter sulcatum, sulci margine postico in medio carina transversa acuta armato.

Femina latet. Long., 7 l.; lat., 3 l.

This is a species of narrow subparallel form, its upper surface subopaque (the elytra more so than the prothorax) and bearing small tubercles all of them isolated and separated from each other by distinct intervals many of which are much larger than the area of the individual tubercles. The tubercles of the prothorax are much larger than those of the elytra and resemble small flattish warts while some of those on the elytra (especially towards the sides) are acutely conical granules. The squamosity of the specimen before me is confined to the sides where it forms small patches but probably in a perfectly fresh example it is generally distributed over the surface. I think the following characters in combination will distinguish this species; rostrum deeply concave with very well developed external ridges; prothorax very sparsely tuberculate (much more sparsely than in, *e.g.*, *T. tuberculatus*, Macl.), and with an extremely strong transverse sulcus a little behind the front margin; shoulders of elytra scarcely projected forward; apical ventral segment of male bearing a feeble transverse impression extending all across it a little

behind the middle and limited in the middle part of its hind margin by a sharply defined transverse carina; tarsi long and slender. From certain points of view the elytra appear to be feebly striate and the seriate arrangement of their tubercles is very irregular.

Central Australia; Oodnadatta.

LONGICORNES.

PARANDRA.

P. Frenchi, sp. nov. Nigro-picea, corpore subtus pedibusque plus minusve rufescentibus; nitida; capite sat crebre minus fortiter punctulato, inter oculos sat fortiter bituberculato; prothorace quam longiori dimidia parte latiori, obsolete subcanaliculato, fere ut caput sed paullo minus crebre punctulato, basin versus sat fortiter angustato, lateribus pone medium subangulatis (hinc ad basin sinuatim convergentibus), margine antico sinuato, angulis omnibus obtusis bene determinatis (anticis antrorsum, posticis extrorsum, prominulis), basi leviter sinuato-emarginata; elytris quam prothorax parum latioribus, punctulatis (ad basin ut prothorax, retrorsum gradatim magis crebre magis subtiliter); segmento ventrali apicali transverso, granulato (a basi retrorsum gradatim magis fortiter magis crebre), postice late rotundato. Long., $9\frac{1}{2}$ l.; lat., $3\frac{1}{5}$ l.

I cannot identify this insect with any *Parandra* yet described. For the sake of precision it will be well to compare it with a previously-named species. Placed beside *P. puncticeps*, Shp., it is seen to be a narrower, more parallel, and more convex insect with the puncturation of its head a little finer but not much different, and that of its prothorax and elytra like that of its head (and therefore very different from the same in *puncticeps*) except that on the prothorax the punctures are a trifle less close and on the elytra they become gradually smaller and closer from the base hindward so that towards the apex of the elytra they differ considerably from those on the head. In *P. Frenchi* the sides of the prothorax are much more narrowed (and that more sinuately) behind their quasi-angulation than in *puncticeps* and the lateral margins are wider and better defined while the front angles are decidedly prominent. The large obtuse tubercles between the eyes are wanting in *P. puncticeps*, and the mandibles are very different in the two insects. I am doubtful of the sex of the type of *P. Frenchi*, but I believe it is a female. Its mandibles are much like those of the *Lucanid Lissotus subtuberculatus*, Westw., as figured Tr. Ent. Soc., 1885, t. 12, fig. 2.

N.S. Wales; in the collection of Mr. French.

C. planicollis, sp. nov. (Mas.?) Nitidus; minus elongatus; brunneus, capite obscuriori, elytris apicem versus pedibusque dilutioribus; capite magno in medio sulcato, fortiter rugulose (area utrinque prope sulcum medianum nitida sparsim grosse punctulata excepta), mandibulis sat productis ad apicem bidentatis; prothorace (spinis exclusis) quam longiori fere duplo latiori, supra in disco planato sparsim subtiliter punctulato et foveis 3 grosse rugulosis impresso (sc. una mediana sublanceiformi, et utrinque ad basin una ovali oblique posita), lateribus late declivibus rugulosis et ad marginem spinis minoribus 2 armatis (his ad apicem retrorsum curvatis); elytris sparsim distincte punctulatis et obsolete 3—vel 4—costatis apice suturali breviter spiniformi; antennis quam corpus paullo brevioribus; pedibus inermibus, abdomine sublævi, sed segmento ventrali apicali (hoc in medio leviter emarginato) sparsim punctulato. Long., 12 l.; lat., $4\frac{4}{5}$ l.

I feel some hesitation in referring this species to *Catypnes* owing to discrepancies between the utterly insufficient original diagnosis of Mr. Pascoe and the fuller subsequent one of M. Lacordaire. For example Mr. Pascoe asserts that the eyes are "nearly entire" while M. Lacordaire calls them "assez fortement échancrés." The insect before me, however, agrees very well with M. Lacordaire's diagnosis; and therefore it would be unjustifiable (at any rate without examination of the type, which is of course impossible for me) to found a new genus for it. It is fortunately a species which can be distinguished from nearly all the other Australian *Prionides* by the combination of a very small number of its characters, viz., "sides of the prothorax not denticulate or crenulate but each bearing two well-defined spines, eyes strongly emarginate (almost exactly similar to those of *Toxeutes*), antennæ shorter than the body with basal joint very much shorter than the third, hind tarsi with basal joint shorter than the third and fourth together, third joint of the tarsi very deeply bilobed and spongiose beneath, legs extremely smooth and nitid without any denticulations, head (at least in the male) transverse and very large.

The present species is readily distinguishable from *C. Macleayi*, Pasc., by the sides of its prothorax having only two (not three) spines. The prothorax of this insect bears a remarkable resemblance in outline to that of *Toxeutes arcuatus*, Fab., but with its lateral spines very much smaller and (though directed hindward) scarcely arched.

Western Victoria; presented to me by Mr. Jung of Yorketown.

TYPHOCESIS.

T. adspersa, sp. nov. Brunnea, capite prothoraceque obscurioribus, elytris dilutioribus, squamis piliformibus niveis (his in prothorace plus minusve lineatim, in elytris ut maculæ numerosæ minutæ et fascia linearis vix antemediana, in abdominis segmentis singulis ut fascia apicalis, in partibus ceteris disperse, dispositis) vestita; setis gracilibus erectis vel suberectis sparsim instructa; capite obscure punctulato; prothorace supra sat deplanato, grosse ruguloso (exempli typici disco hic illic quasi ab indumento sculpturam tegenti instructo), lateribus in medio fere parallelis apicem versus rotundato - angustatis pone medium subito fortiter arcu emarginatis (sicut certo adspectu pone medium dens magna videtur); elytris ad basin rectis, basin versus sat crebre fortius rugulose (retrorsum gradatim magis sparsim magis obsolete) punctulatis, lateribus postice gradatim leviter convergentibus, apice singulatim rotundato - subacuminato, humeris rotundatis subcallosis. Long., $7\frac{1}{2}$ l.; lat., $2\frac{1}{2}$ l.

The specimen described is evidently a male, its antennæ being considerably longer than the body, but they are devoid of the ciliæ with which in the other species of the genus the basal joints of the male antennæ are clothed; joints 3-7 are armed with a fine spine at their apex. There is a second specimen evidently a female of the same species, as its antennæ are scarcely longer than the body, but it differs from the example described in being entirely black, but with exactly similar snow-white scales similarly disposed. It differs from the described specimen also in its prothorax being evenly rugulose instead of having some of the rugulosities on the disc obliterated by what looks like (but is not) patches of some extraneous indumentum. The markings on the elytra are almost absolutely the same as those on the elytra of *Zygocera pruinosa*, Boisd., the post-median fascia however being absent and the anterior fascia running from the suture obliquely hindward instead of forward.

N. Queensland; forwarded by Mr. French.

ISCHIOPLITES.

I. metutus, Pasc. Mr. French of Melbourne has forwarded to me two examples, which he tells me were taken in N. Queensland, of an insect that seems to agree perfectly with the description of this species. It is possible that a comparison with the type might reveal differences but I can find none to distinguish it from the description, which is a fairly detailed one.

ILLÆNA.

This genus is an enigma to the Australian coleopterist. I

should feel very thankful if some coleopterist in Berlin would do me the favor of procuring one of Erichson's types for me to examine (which might perhaps be possible if the specimens in the Museum are fairly numerous), or failing that examine the type and write me a description of it, especially indicating the nature of the armature of the prothorax which in one place Erichson calls "lateribus medio obsolete nodosus" and in another speaks of as being furnished "lateribus pone medium tuberculo parvo." Pascoe described a genus *Neissa* as resembling what *Illœna* must be, but no doubt distinct from it because furnished with a spine on either side of the prothorax. Subsequently I suggested (P.L.S.N.S.W. 1889, p. 455) that Erichson's expressions are not consistent enough to warrant this conclusion and expressed the opinion that *Neissa* and *Illœna* are probably identical. Subsequently still, Mr. Gahan [Tr. E.S. 1893, p. 196] mentioned his having seen an insect named (by M. Chevrolat) *I. exilis*, the prothorax of which was spined laterally and added the information that Mr. Walker had found examples of it in Tasmania (Erichson's locality). Recently my opinion on the matter has been somewhat shaken by the examination of a minute Longicorn (taken in N.S. Wales by Mr. Lea) which seems to agree much better than *Neissa* does with Erichson's description of *Illœna;* indeed I do not find any character on which this insect could be definitely stated to differ from that description provided the diagnosis of the prothoracic armature be accepted as "lateribus medio obsolete nodosus" rather than the other diagnosis which implies the presence of defined lateral tubercles. As regards Mr. Lea's insect as a *species* it must be very like, if not identical with, Erichson's species; and although the great difference in locality would suggest the probability that if Erichson's type could be compared it would prove distinct, I deem it better to regard this insect *pro tem.* as "*Illœna exilis*, Er. ?" and suppose that the species is widely distributed.

New Facts bearing on the Glacial Features of Hallett's Cove.

By W. Howchin, F.G.S.

[Read April 3, 1895.]

A scientific investigator in looking for one thing often unexpectedly stumbles on another which proves of greater interest than the primary object of his search. Eighteen years ago Professor Tate went to Hallett's Cove to look for shells. He was disappointed in the objects of his visit, but discovered the ice-polished surfaces on the cliffs which remain to this day the finest examples of their kind in any part of Australia. The announcement then made of glacial action at sea level in the latitude of Adelaide was met with incredulity not only from the public, but also from many scientific men, who without seeing the evidences prejudged the conclusions from a distance. Competent judges, however, when taken over the ground, without exception, confirmed the discoverer's diagnosis; and the interest with which this locality has come to be regarded by the geological world has rapidly increased, and Hallett's Cove must now be ranked as classic ground in Australian geology.

The meeting of the Australian Association for the Advancement of Science, in Adelaide in September, 1893, presented the opportunity for a large number of scientific men from the other colonies of verifying the evidences, and through the generosity of the President of the Association, what was called by Sir James Hector "the largest scientific excursion ever held in the Southern Hemisphere" made a pilgrimage to the spot. The evidence of ice action was taken by all present without a doubt and as overwhelming in its conclusiveness. There was the polished and grooved pavement extending at intervals for two miles along the top of the cliffs, and occurs alike on the basset edges of the purple shales as well as on the harder quartzites. There was also noted a limited quantity of morainic material, with scratched stones, resting on the glaciated platform, together with larger transported blocks at the southern end of the Cove. There was no difference of opinion on the main facts. The discussion among the geological experts was directed almost exclusively to the question of the age when this extensive glaciation occurred. Some defended the view that the glacial features did not pass under the Miocene escarpment, which at this point overlies the Archæan

shales and reaches in its talus within a few yards of the edge of the cliffs. This view supposes that the morainic matter was marginal, and that instead of passing beneath the Miocenes was banked up against the face of these beds. If this could be demonstrated it would follow that the glaciation had taken place after the Miocene deposits had been laid down, and, hypothetically, synchronous with the great glacial age of the Northern Hemisphere in Pleistocene times. Other of the visitors held this hypothesis to be improbable, (1) on the grounds that the geological interval was too brief to account for the enormous change in the physical features of the country which must be assumed in the extinct glacial valley, and that the direction of flow, which was opposed to the present lines of drainage. (2) It was considered that the soft clays and sands of Miocene age must have been swept away by the erosive force of an ice sheet that had the mechanical energy to plane down metamorphic shales and quartzites.

The question was considered of so much interest that the Council of the Association determined to set aside the sum of £20 as a fund to be devoted to works of exploration, and by this means demonstrate whether the glacial features were Pre-miocene or Post-miocene. Professor Tate and the writer of the present paper were entrusted with the duty of carrying out the explorations for this object. Valuable aid was given by Prof. T. W. E. David, the General Secretary of the Glacial Research Committee, who in December last visited Adelaide with the express purpose of assisting in the investigations. Mr. L. Birks, B.Sc., of Adelaide, was also present throughout the examination and rendered important help.

The first practical step was to obtain permission of the proprietor of the ground, Walter Reynell, Esq., J.P., to carry out the necessary operations. Mr. Reynell not only readily gave his permission, but supplied several workmen and tools to do the pick-and-shovel work. Three days were spent on the ground. The first was devoted to a general survey of the features under the guidance of Prof. Tate. The second and third days were spent in working up the details and in mapping the boundaries of the glacial deposits on the north side of Field River. Prof. Tate was unfortunately called away by urgent business and was unable to remain for the last two days' work.

Exploration.

The point to be determined was—On what do the Miocene beds of the locality rest? Do they lie immediately on the denuded edges of the Archæan metamorphic shales? Or are the

Miocene and Archæan formations separated by a wedge of glacial till? The first trial was made near the northern limits of the glacial area and at a point where the base of the Miocenes is distinctly marked by a shelf of calciferous and fossiliferous sandstone. Beneath this hard shelf of rock was a softer bed of doubtful character. A tunnel was cut for a foot or two into this underlying bed, which proved to be an arenaceous clay of a greyish color, and was seen to pass beneath the Miocene beds in an undisturbed condition. This was the first important item of evidence. We had found a bed which could not be classified either with the Archæans beneath or the Miocenes above. To expose the beds still further a trench was cut in a vertical line with the tunnel, but lower down the escarpment. The same beds as seen in the tunnel were proved in this cutting, unaltered in character, but alternating in color from red to blue or grey, and intercalated with sand bands. No junction was proved at this spot between the stratified glacial beds and the underlying Archæans, as a considerable talus blinded the latter.

A little to the south of these trials is a well-marked valley which runs due east for half a mile. This valley is excavated in a thick deposit of glacial till, carrying numerous scratched stones and erratics. One large block of coarse-grained granite measured three feet long by two feet wide. Near the western outlet of this valley the Archæans have been exposed by denudation and exhibit polished and scratched surfaces, covered by a bare and sloping bank of morainic matter. Scratched stones were plentiful in this clay. Work was begun at this spot to establish the conjunction of the glacial deposits with the Miocene base, but after a short trial it was discontinued, as a thick talus of Miocene *debris* was found covering the face near the point of junction.

A third spot was selected about midway between the valley just referred to and Black Point, where the Miocene ledge approaches nearest to the edge of the cliffs. The Archæans were seen to outcrop at the base of the hill, but without glaciated surface, whilst the Miocene ledge occupied the crest of the hill. A distance of about a dozen yards separated the two points. On laying bare the Archæan surface, the purple shales exhibited a highly glaciated face, having a steep inclination landwards, and the glacial clay was seen to be in direct contact with the polished surface. The trench was continued, vertically, until the uniformity of deposit between the Miocene base and glaciated pavement was demonstrated, the lithology of the beds agreeing entirely with those exposed in the first trench. The results obtained were considered the *quod erat demonstrandum* of the investigations and rendered any further exploratory work needless.

The Glacial Beds.

These are strongly marked off from the Archæans, on which they rest by a horizontal, or approximately horizontal stratification, as well as essentially distinct *lithological* character. They are also distinguishable from the overlying Miocenes in possessing a thinly-bedded or laminated structure, the clays are more tenacious, they frequently contain striated stones and erratics, and are separated from the Miocenes by a strongly-marked divisional plane. The line of division between the two formations gives evidence of unconformability in the eroded surface of the till and the presence of water-worn boulders, which often occupy the line of junction.

The glacial deposits thin out to the north, about half-a-mile from Black Point, where they are about 20 ft. thick, beyond which point they have not as yet been proved. They maintain an approximately uniform thickness on the top of the cliffs, but suddenly thicken within the limits of the Cove, attaining a maximum thickness in "Trig Hill," as measured by the aneroid, of 112 ft. The hill just mentioned is central to the amphitheatre of the Cove, and was a convenient point from which to take the trigonometrical readings. The glacial beds were traced from this height uninterruptedly (except where covered by blown sand) down to low-water mark. On the southern half of the Bay a steep escarpment rises to a height of 90 ft. facing the sea, and is composed throughout of boulder clay with erratics. The same beds are continued on the south side of Field River at a similar height, the river occupying a valley of erosion that has been cut through the glacial beds. How far these deposits extend seawards, and below sea level, are problems that remain to be solved. As so little money was spent on the late explorations, perhaps the Council of the Association for the Advancement of Science may think fit to make another grant, that the thickness of the beds at sea level may be tested.

Lithology of the Beds.

The beds which have been laid down within the glaciated area may be roughly classified as mudstones, friable sandstones, and conglomerates. The two trenches that were cut passed through the upper series of beds, and exposed alternating beds of reddish and grey clays, with soft sandstones of a yellowish color. These beds are distinctly stratified, and the materials uniformally fine, no stones, indeed, of any kind were met with in the trenches. A little further to the south, where the beds thicken, a dark-colored mudstone, with sandy layers and inclusions, is met with, and is highly charged with facetted and scratched erratics. This can be noticed in a thin layer on the top of the Black Point

Cliffs, but is best seen in the basal portions of the amphitheatre of the Cove, as well as in the escarpment on the southern side of the Bay, and upon the beach between tide marks. The mudstones, where they have not been exposed to the weather, are very compact and tough, and split into thin bands and cubical fragments. Thin layers of sand occur in the mudstones, and it is along the lines of these sandy partings that the rock usually splits. The sand grains are rounded, and exhibit the effects of considerable attrition, but the sand-beds are but slightly consolidated in mass, and do not, as a rule, split on lines of bedding. The conglomerates are best seen on the beach at low water, where they stand up as weathered bosses, excavated from the surrounding clays by the action of the waves. On this floor of marine denudation numerous joints are seen to run irregularly through the glacial till, and are rendered conspicuous from their being filled with a dark-colored ferruginous material.

Boulders.

If any confirmation were needed that we are face to face with glacial phenomena at Hallett's Cove, it is found in the innumerable, subangular, facetted, and scratched erratics which occur abundantly at the lower levels of the Hallett's Cove beds. As already stated, no stones of any kind were met with in the two experimental trenches cut through the beds on the northern side of the area. This may have arisen from the shallowness of the trenches and the small extent of rock exposed. The boulder till is first seen on the northern boundary of the area in the banks of the east and west valley, and on the top of the cliffs a little to the south of the principal polished face of rock. From the latter position a goodly number of striated stones have been obtained. From that point, southwards, they become conspicuous in all exposed surfaces, and can be found from the size of small pebbles, up to large masses many tons in weight. Several huge erratics occur on the beach, near the centre of the Bay, whilst on the south side of the Field River they cover the beach within tide marks, and are of great variety, as well as innumerable. It is a common feature to observe a layer of boulders at the junction of the glacial beds with the overlying Miocene, and in some instances these boulders are included in the lower part of the Miocenes themselves. They have the facies of glaciated stones, and in one or two instances I could detect the striæ distinctly preserved on their surfaces, although the wash they have been subjected to at the time of the encroachment of the Miocene Sea has no doubt obliterated the surface features from many of them. A large enclosure of metamorphic shale, in the same position, measuring twelve feet in length, has attracted

the attention of scientific visitors to the Cove. There is now no doubt that this immense fragment has been transported and placed in its present position by the agency of ice. One of the striated pebbles placed on exhibit is of interest, as taken by the writer from near the top of the "Trig." Hill, 112 feet above sea level.

Many of the erratics have no doubt been derived from the Archæans of the neighbourhood, but there are a great many that are unrepresented by any rock now known in situ for many miles, and proves that the ice must have been more than of local extent. I fear that we have too little data at present to locate these travelled stones with regard to their source. To do this effectively would involve careful petrological examinations—a promising field of research that is awaiting some competent student in this department.

Superficial Area of the Glacial Deposits.

Fortunately two little streams cut the glacial beds through their entire easternly extension, one on the north side of Black Point, and the other to the south of that landmark, so that the area of this fragment of glacial action can be mapped with approximate exactness. By following up the beds of these streams it was found that the glacial deposits extended about half a mile from the coast line, passing not only up the main, but the lateral valleys, and thinning out as the higher altitudes were reached. In the most southernly of these two streams the limit of the beds was reached near the old sheds, well known as the usual camping place for picnicers in visiting the locality. In restoring the glacial area we must imagine the outline of the Cove in preglacial times to be that of a comb or saucer-shaped depression on the flanks of the Archæan hills. The ice sheet, moving from south to north, filled this lateral depression and passed over the minor heights on its northern and southern limits. A depression of this kind on the flanks of a glacier would supply the most favorable conditions for the accumulation of a ground moraine, and its contents would also be subsequently protected from the erosive forces by the wall of hard rock with which it was nearly surrounded. The deposition of the Miocene beds over the same area in later times would still further help in preserving this remarkable outlier, the Tertiary beds acting as a protective cover that has remained to the present day.

The Age of Glaciation

is a most interesting, although difficult, question to solve. The beds in question rest upon rocks of Archæan age, the most ancient of the sedimentary series, and are capped by Miocenes, one of the newest of the geological formations. They may, therefore, be

of any age between these geological landmarks. But the time limitations are here so enormously distant from each other that they serve little purpose in fixing the date of the intermediate deposits. We can only fall back on analogies, and establish a synchronism, if possible, with the glacial deposits of other localities that offer the nearest resemblances to the beds in question. As the glaciation must have taken place before the Miocene beds were deposited, it is out of the question to refer this refrigeration of the Australian climate to the so-called Glacial Period of the Northern Hemisphere, which took place in Post-Tertiary times. In conversation with Sir James Hector, on the occasion of his visit to the spot, he suggested the possibility of the glaciation being of Cretaceous age, and stated that there were enormous glacial deposits of this age in New Zealand. I am not aware that any indications of glacial action have been observed with regard to the Cretaceous beds of this continent. There are, however, abundant evidences of a glacial period of great intensity which occurred in South-Eastern Australia during Permian, or Permo-Carboniferous times. Near Bacchus Marsh and Derrinal, in Victoria, there are glacial beds (sometimes seen to rest on polished and grooved pavements) that can be traced over hundreds of square miles, and must be several thousand feet in thickness. Having recently visited the Bacchus Marsh District, I have been able to place on exhibit, for comparison with the Hallett's Cove material, a series of specimens from the Victorian beds. The close resemblance between these two sets of exhibits will be appreciated by all. The Bacchus Marsh beds appear to have suffered more disturbance than the Hallett's Cove beds, as they dip almost uniformly at about 42° They consist of alternating beds of mudstones, thickly studded with glaciated boulders, sandstones, grits, and conglomerates. Many of the beds exhibit fine laminæ along the lines of stratification, and at other spots are locally much distorted, as though ploughed up before the ice. In lithological features they closely resemble the Hallett's Cove mudstones, sands, and conglomerates, but are more highly indurated, and in this respect have more the facies of rocks of Upper Palæozoic age. The sandstones particularly are often highly siliceous, and in one case, in the Wirribee Creek, there occurs a band of hard quartzite (a specimen of which is on the table). The age of these glacial beds of Victoria has been determined by the remains of *Gangamopteris*, a fossil fern characteristic of Permo-Carboniferous age, which occurs in considerable numbers at one or two horizons intercalated with beds of glacial origin. The importance of these glacial conditions in Permian times is accentuated by the fact that deposits which seem to require ice action to account for their existence, are

found of this age in such remote places as Great Britain, India South Africa, and Australia. It is possible that further search in the Hallett's Cove beds may bring to light some fossil remains that will definitely fix the date of their deposition, but at present analogy seems to point most strongly to the conclusion that the Bacchus Marsh and the Hallett's Cove formations belong to the same geological age. The Victorian beds rest on Silurian, or on granite, and, like the Hallett's Cove beds, are capped by Tertiaries.

The Inman Valley Shale.

Since the late important discoveries at Hallett's Cove, it has occurred to me that there may possibly be some relationship between the glacial beds of the latter and the mudstones which occur in an isolated patch in the Inman Valley. The peculiarity of this formation attracted the attention of Mr. Brown, the Government Geologist, who thought it might be an outlier of the Jurassic rocks of the Leigh's Creek district, and under his advice the Government has bored through nearly a thousand feet of these beds prospecting for coal without reaching the bed rock. Evidences of glacial action are not wanting in this district. Granite boulders of great size can be traced from the Bluff, as a radiating centre, up the Inman Valley for miles. As far back as 1859 Mr. A. R. C. Selwyn reported as follows :—"At one point in the bed of the Inman I observed a smooth striated and grooved rock surface, presenting every indication of glacial action." Although this spot has, unfortunately, not been rediscovered, it is not likely that so good a field geologist as Mr. Selwyn should have been deceived in his observations. Mr. H. Y. L. Brown in his report (1892) describes these undetermined deposits in the following terms :—"This formation consists of a jointed shale, varying in color from a bluish-green to black, and interstratified with them there are undulatory beds of sandstone and quartzose sandstone, and occasionally limestone of irregular thickness. The upper portion of this shale, which in some places exhibits a concretionary structure, has become decomposed into clay, and contains water-worn pebbles and boulders of granite, quartzite, sandstone, ironstone, &c. Some of the boulders of granite are of great size, and in character resemble the granite of Victor Harbor." I think from the evidences before us it is not improbable that these anomalous beds of the Inman Valley may prove to be of the same character and age as the Hallett's Cove and Bacchus Marsh glacial formations.

The Source of the Ice.

A word may be said, in conclusion, as to the probable source from whence the ice originated. In view of the extremely low

latitude of Hallett's Cove, which agrees with North Africa and the southern shores of the Mediterranean in the opposite hemisphere, we might have fallen back on the iceberg theory if the features had been reconcilable with such an hypothesis. This, however, is inadmissable. Berg ice could not possibly polish and groove hard rocks over extensive areas, whilst maintaining definite lines of erosion and striæ, such as occur at Hallett's Cove. The polished floor near the coast is indeed a huge *roche moutonnée* in the form of a ridge, with an elevation of about 20 ft., presenting uniform lines of glaciation on all sides. I am led to think that only terrestrial ice of great thickness and operating through a long period could produce effects such as have been referred to. Again, as far as can be judged at present, the morainic matter has been gathered from local, or at least South Australian, sources. Moreover, most of the beds are distinctly stratified (which could scarcely be expected of iceberg *debris*), and in their deposition show thin, alternating beds of different lithological character indicating the presence of water operating under quiet conditions. Lastly, in the absence of organic remains the proof is wanting that the Hallett's Cove beds are of marine origin, for whilst many of the clay bands are eminently adapted for the preservation of such, no fossils have hitherto been discovered in them. The land plants of the Bacchus Marsh beds seem to point to fresh-water conditions in analogous formations in the adjoining colony, and I should anticipate a greater probability of finding similar remains in the Hallett's Cove beds than a marine fauna. There seems to be only two suppositions which could offer adequate conditions for the glaciation of Southern Australia. Either a much higher altitude of the land, with the main mountain systems restored to the height they possessed before suffering the waste undergone during the enormous period separating Palæozoic times from the present; or the extension of the Antarctic Continent and ice-cap into lower latitudes, with the physical contour of the land such as to deflect the Antarctic currents to our shores, so that Southern Australia would be climatically much nearer the Southern Pole than it is to-day. Either of these factors—or, perhaps, both conjointly—may have supplied the efficient cause of that refrigeration of climate in South Australia, the evidences of which we have discussed to-night.

Petrographical Observations upon some South Australian Rocks.

By J. Collett Moulden, Associate Royal School Mines, London.

Communicated by J. East, F.G.S.

[Read May 7, 1895.]

Through the kindness of Mr. J. J. East, F.G.S., Registrar of the School of Mines and Industries, Adelaide, I have been enabled to examine a small series of rocks, chiefly South Australian, from the collection of that Institution, and the following observations on them may prove of interest.

In each case, thin sections for examination under the microscope were cut, and the component minerals of the rock, its nature, structure, and texture were examined.

The sections number 20 in all, and some possess many points of interest.

The contributions to the Petrography of South Australia have, in the past, been very meagre—the harvest indeed is rich but the reapers few—and the few notes herewith appended will, I hope, merely serve to point out the great desirability of such work being actively pushed forward in the near future.

I wish it to be quite understood at the outset that these rocks have been named on petrographical grounds, combined with a microscopic examination of the hand specimens. I have, unfortunately, at present, no opportunity of studying these examples in the field, and knowing what a terrible stumbling-block in geology the nomenclature of rocks is, one may easily conceive that some of the names may have to be slightly modified after an examination of the rocks *in situ*. Even under such circumstances the names to be applied to them is greatly a matter of individual opinion.

The localities of the rocks are mostly well known and authenticated—some, indeed, were personally collected by Mr. East—and these circumstances render it the more desirable that reliable information should be forthcoming concerning them. In some cases the specific gravity of the rocks was taken by means of a Walker's balance.

I. Olivene Basalt, Mount Eden, Auckland, N.Z.

The rock consists of *plagioclase*, *olivene*, and *magnetite* in grains, with a fair amount of *augite*. The olivene is fresh, gives the usual splendid polarisation-colors, and has the usual irregular

cracks. The plagioclase is in lath-shaped crystals in the base. The olivene crystals are corroded by the magma. The felspar microliths in the base show the flow-structure well. The augite encloses some dark grains, undetermined. The whole mass is rather scoriaceous in character, so the specific gravity was not determined. It is quite a typical olivene basalt.

II. Olivene Basalt, Mount Gambier, S.A.

The minerals composing this rock are—*Olivene* in rounded grains, cracked and a good deal corroded by the magma ; they are fresh and clear. *Augite* of a brownish-green color, fresh and giving good polarisation colors ; it is allotriomorphic. *Plagioclase felspar* in lath-shaped clear crystals in the ground mass. *Magnetite* is plentiful in the usual black grains scattered throughout the mass. The sp. gr. of the rock = 2·73, which is rather low due perhaps to the presence of cavities and gas-holes. It is a fine grained typical rock, and shows flow-structure.

III. Olivene Basalt, Kangaroo Island.

This exceedingly interesting rock consists of *plagioclase felspar*, both as porphyritic crystals and as the usual laths in the base. The former at times show most beautiful zoning and inclusions, with the usual lamellar twinning of plagioclase.

Augite is plentiful. It is, curiously enough for a basalt, quite clear and colorless, and well-twinned in some crystals, while others exhibit good "hour-glass" structure. Owing to its being colorless and having such a high refractive index, it is not always easily to be distinguished from some of the olivene present.

Olivene occurs as fresh and clear grains corroded by the magma, while *magnetite* is abundant in the usual black grains.

Felspar and augite are the most abundant constituents, then olivene, and lastly magnetite. The rock is typically ophitic in structure, and there is a good deal of glass of a dirty brown-green color in the base, which is quite isotropic. The rock is a very basic one in character, as may be guessed from the mineral components, and it has a sp. gr. of 2·88. The rock is not holocrystalline, but it has otherwise rather the character of a dolerite (ophitic), but I have called it a basalt since I have no information as to its field occurrence, but since the specimen was labelled "Columnar Diorite," I presume it must exist as a lava flow. If, however, it occurs as a dyke-rock, dolerite might perhaps be applied to it as a name rather than basalt. This seems to have been the rock noted by Dr. Chas. Chewings.* The most important and perhaps also the most valuable feature of this

* "Beitrage zur Kenntnis der Geologie Süd und Central Australiens" (Petrographischer Anhang.), Heidelberg, 1894.

rock is that it is gold-bearing. The hand specimen in my possession shows a small speck of metallic gold imbedded in it. I do not know whether I am correct in so saying, but I believe this this to be the first recorded occurrence of gold in a volcanic rock for South Australia. Whether it really occurs as an original constituent or not it would be impossible to conjecture from the evidence at my disposal, but the field-occurrence is at least well worth an investigation. Supposing that it is not an original constituent, it is easy to understand how a lava flow in passing over auriferous sands or gravels might catch up and include some of the gold, as has been the case with the zircons occurring in the basalts of the Eifel District in Europe. On the other hand, if the basalt occurs as a dyke-rock,* the dyke may have intersected an auriferous quartz reef and caught up some particles of gold or auriferous quartz. The quartz, in the presence of such basic materials as compose this rock, would be corroded and finally dissolved away, leaving the gold as an included speck. It is curious that the speck should occur in such a small hand specimen as I have, the dimensions of which are not greater than about $2\frac{1}{2}'' \times 1\frac{1}{2}'' \times \frac{3}{4}''$.

The rock is fine-grained and compact. Another point of some interest is that, although it is a basalt, still the magnetite in it is not large in amount, and most of the minerals composing it are colorless, or nearly so. On one edge of the specimen and in one or two other places there are some reddish-brown clear minerals of high refractive index, which appear to be either garnet or zircon. As they do not appear in section it is very difficult to say which. The specimens of this mineral are not large, but are quite easily seen by the unaided eye.

IV. Axinite Amphibolite, Rosetta Head, S.A.

This is a very much altered rock, which consists mainly of *hornblende* and a perfectly colorless *augite*, the former largely predominating. Some *biotite* is present in minute crystals, with *quartz* and *chlorite* as accessories. It has been much altered, as evidenced by the chlorite, &c. The one great point of interest in this rock is the presence of a considerable amount of the mineral *axinite* as a rock-forming constituent, which occurs not only as allotriomorphic grains but also as idiomorphic crystals, which in section give most perfect lozenge or hatchet-shaped sections. In one part of the hand specimen there is a small druse or cavity,

---

* This rock was observed at Kingscote by Prof. Tate in 1881 and in the Freestone Range in 1883; it was reported a diorite intrusive in mica-schist in Trans. Roy. Soc., S.A., vol. vi., p. 122, 1883, and in the accompanying geological map its course is laid down, though by inadvertence was not prolonged to the sea-cliff at Kingscote.—[Editor.]

wherein there are some of the most beautiful and characteristic sharp-edged triclinic crystals of axinite of a brown-violet color, and whose edges, where broken, exhibit the curious serrated fracture of that mineral. These crystals are, roughly, from $\frac{1}{5}''$ to $\frac{1}{4}''$ across. In the section they are very pleochroic. Many of them show cleavage cracks parallel to 010 ($\infty P \breve{\infty}$) and the polarisation-tints are not high. If it occurs, as I imagine, in contact with the granite, which forms Rosetta Head, it can easily be understood that the conditions would be favorable to the occurrence of axinite. I am not aware that axinite has before been recorded for South Australia, though Liversidge ["Minerals of New South Wales," p. 183] has recorded it for that colony.

The zircons seen in the section of this rock are very good. Taking it on the whole, axinite-amphibolite seems the most suitable name for it. The augite is frayed and bent in places.

V. Epidote Rock, Wooltana, Far North Ranges.

Epidote of a greenish-yellow color and with high refractive index, for the greater part, composes this rock, which is exceedingly compact, fine-grained, and has a sp. gr. of 3·18. It seems rather altered and does not show much pleochroism. The hand specimen on one side shows some of the characteristic pistachio-green epidote. Magnetite in irregular grains is scattered throughout the mass There is a mineral, probably secondary quartz, filling up interstitial spaces. In mass it is of a very dark-green color and heavy. In the section the epidote appears to be quite granular, and it makes up by far the larger part of the rock, which seems to present no particular feature of interest.

VI. Altered Amphibolite (with Epidote), Hale River, lat. 23° 40′ S.

This is composed chiefly of *hornblende*, with the usual 120° cleavage cracks ; some of the hornblende is twined. It contains also a good deal of hornblende altered to *chlorite* and *epidote*. The epidote fills up the cracks. A little secondary *augite* is present.

Some parts of the section appear greatly clouded. Its polarisation-colors are most beautifully bright and the whole mass is greatly altered. The sp. gr. = 3·10.

It is holocrystalline and the texture inclines to coarse. It is an amphibolite which has undergone change.

VII. Altered Diorite, Hale River, lat. 23° 40′ S.

This rock is a diorite, which has been somewhat altered. It is composed of *hornblende*, showing splendid cleavage cracks inter-

secting at about 120°. Some of this mineral has undergone chloritic change. *Plagioclase* polysynthetically twinned and altered ; *epidote* in fair grains as an alteration product ; secondary colorless *augite*, sparingly ; secondary *quartz*, which is very clear and contains liquid enclosures ; and *apatite* which is rather abundant in grains. Some *sphene* is also present as an accessory. It has a sp. gr. of 3·03.

The whole rock has been a good deal crushed and indicates a tendency to become schistose.

VIII. Augen Gneiss, Florence River "Ruby" Field, Central Australia.

This gneiss is composed of a good deal of *biotite*, which is very pleochroic ; *plagioclastic felspar*, beautifully twinned and clear, the twin lamellæ show intense strain and bending, and in fact the whole rock has been much strained and shorn ; *quartz*, forming a mosaic with felspar ; *microcline* containing *apatite (?)* as needle-like inclusions ; *garnets* of a clear pink color, surrounded by *biotite* and some greenish alteration products ; *epidote(?)* with high polarisation colors. The garnets are isotropic. Some of the felspar contain some ramifying masses of calcite as a secondary infilling. A little rutile is present as an accessory constituent. The rock has a sp. gr. of 2·75 and has a perfectly gneissose structure. Zircons in small crystals are present, as is often the case in these rocks. It is an augen-gneiss with garnet.

IX. Garnetiferous Gneiss, from same locality as No. VIII.

The minerals present are as follows :—*Plagioclase felspar*, showing splendid lamellar twinning ; one piece shows both the albite and pericline types combined ; it is fairly clear. *Orthoclase felspar* is present ; *quartz* in plenty, also as an inclusion in the garnets present ; *biotite* in plenty ; *garnets* of a beautiful pink color are abundant in the slide and hand specimen, they are irregularly cracked across and are full of cavities and inclusions, are quite isotropic and show no anomalous optical characters. *Rutile* is present as an accessory mineral ; crystals of light yellow and of a dark red are present, both as simple prismatic forms and as geniculate twins. The geniculation angle of one of the latter was found to be 114° 30′ (this angle is given by Rosenbusch as 114° 25′). In some cases the rutile occurs as an inclusion in biotite, while in one case it occurs in garnet. *Apatite* occurs, both as fairly large prisms in felspar and as long needle-like forms ; *zircon* is moderately abundant as an accessory in small colorless crystals with dark borders, due to the high index of refraction.

The whole rock is typically metamorphic, has a sp. gr. of 2·83 and is rather coarse-grained.

X. Syenite Porphyry,* Yardea, Gawler Ranges.

This rock, which has been a good deal altered, is composed of a felsitic ground-mass of a brown color, in which occur porphyritic crystals of *felspar*, greatly altered and clouded. This felspar polarises in low tints, and much resembles soda-orthoclase. *Augite* is present as a porphyritic constituent, the crystals of which have been much altered, with separation of brown iron-oxide, especially along the cleavage cracks. There is a blue mineral, with high refractive index and quite unaltered, present in the ground-mass in tiny granules, which I have not been able to determine (corundum ?). *Apatite* is present as an accessory. The felspars show secondary growth very well. The rock has a sp. gr. of 2·63, is very hard and compact, and tends to break with a splintery and rather conchoidal fracture; it may be an anorthoclase syenite porphyry.

XI. Biotite Granite (from an erratic boulder), Hallett's Cove, S.A.

This rock is a coarse-grained granite. The hand specimen is a small one and rather weathered. It consists of *felspar*, *orthoclase*, with a little *plagioclase*, cracked, clouded, and altered; *quartz* in plenty, containing liquid cavities; *biotite*, a good deal altered and darkened. The texture is coarse and the structure typically granitic.

XII. Coarse Muscovite Granite (Pegmatite), Mount Gawler, near Port Lincoln, S.A.

This is a much decomposed rock of a very coarse texture. The felspar has nearly all passed to kaolin, the plates of muscovite are turning silvery-white, and losing their transparency and elasticity. The quartz is abundant and, of course, unaltered As this rock was so decomposed and presented no particular features of interest, no section was cut, but the foregoing notes were made from an examination of the rock specimen itself. It is an exceedingly acidic rock.

XIII. Biotite Granite (red), Murray Bridge, S.A.

This granite, which is coarse-grained, consists of *orthoclase* and *microcline*, the latter showing microperthitic structure; *plagioclase* well-twinned in lamellæ; *quartz* in large grains, which appear smoky in the hand specimen and in the section are seen to be full of beautiful liquid cavities with moving bubbles. *Biotite* is present in fair amount. *Apatite* occurs as an accessory con-

* *Vide* "Report on the Geological Character of Country passed over from Port Augusta to Eucla," H. Y. L. Brown, Adelaide, 1885. No quartz at all observable in my sections.—J.C.M.

stituent; a basal section of this mineral shows the common hexagonal outline, the sides of which measure about $\frac{1}{16}''$ in length. Quartz and felspar are intergrown, forming micrographic structure. It shows no special characters beyond those noted, and is a typical granite, having a sp. gr. of 2·63.

XIV. Granite (Grey), Monarto, near Murray Bridge, S.A.

The section shows *orthoclase* in zoned crystals, *microcline* with the common "cross-hatching" well shown between crossed nicols. Some *plagioclase felspar* is likewise present. *Quartz* is fairly abundant and in some parts is intergrown with orthoclase, giving micrographic structure. Both *biotite* and *muscovite* are abundant and are intergrown. The biotite shows some pleochroic haloes around included crystals of zircon. *Zircons* are also present as inclusions in felspar and quartz, while apatite also occurs in some of the felspars. The hand specimen shows the rock to be fine grained and compact; the structure as seen from the slide is typically granitic.

XV.(a) Biotite Granite (with Microcline and Sphene), Palmer, S.A. (Collected by the author.)

This rock is a reddish granite and has a sp. gr. of 2·63. It consists of *orthoclase*, which has so intergrown with quartz in places as to give micrographic structure; *microcline* with very good cross-hatching visible between crossed nicols; *quartz* is abundant and contains liquid enclosures. The felspars are clouded and altered somewhat. *Biotite* is in plenty and some of the pieces show pleochroic haloes around included crystals of zircon. As accessory minerals are present—*zircon* in moderate sized prisms; *apatite* in prisms and larger sections; *sphene* and *ilmenite* are pretty conspicuous, occurring sometimes together. The structure is quite granitic and the texture moderately fine. The plagioclase is, as usual, at once seen by reason of its prominent lamellar twinning. A fair amount is present.

XV. Biotite Granite, Kaiserstuhl, Tanunda, S.A.

This rock is made up of the following minerals:—*Quartz* abundant, showing micrographic structure with felspar in places. It forms a good "mosaic" owing to the rock having been crushed. *Orthoclase* and *microcline* in plenty; the "cross-hatching in the latter is very well developed indeed. *Plagioclase* is present in fair quantity, and in places it includes mica. The felspars are clouded and altered. The micas present are *biotite* and *muscovite*, the former in excess of the latter. They are crushed, frayed, and bent, and the muscovite is intergrown with the biotite in places.

The rock in structure and texture is almost identical with No. XV.(A), but it is crushed and has a metamorphic appearance. Apatite is present as an accessory constituent, as also are ilmenite, sphene, and zircon, though sparingly. The felspars appear to have been crushed. The sp. gr. was found to be 2·62.

XVI. Biotite Granite, Port Victor, S.A.

This rock is a coarse-grained grey granite, compact and hard. It consists of the following minerals:—*Quartz*, very conspicuous in good-sized masses both in the hand specimen and the slide. It has a curious blue color and opalescent appearance, and, in section under the $\frac{1}{4}''$ objective, shows some liquid enclosures, though they are not nearly so large or so abundant as in the quartz of No. XIII. The felspar is mostly *orthoclase*, sometimes well-zoned; but *plagioclase* is also present, as shown by lamellar twinning. The predominant mica is *biotite*, but a little *muscovite* is also present. *Zircons* in small crystals occur as accessories in some of the biotites, while the hand specimen shows some small spots and grains of *pyrites*. The liquid cavities in the quartz contain moving bubbles in some places. The rock is altogether a typical granite, the most curious feature of which is the "blue" quartz resembling that of the Norwegian "Rumburgite." Some of the felspars show good secondary growth.

XVII. Obsidian "Bombs" (2), Stuart's Creek, Lake Eyre, S.A.

These two specimens are types of the "bombs" which occur in so many parts of Central Australia. They appear to have been slightly water-worn. Their origin is, as yet, quite unknown. They consist of a brownish volcanic glass, which in section gives no trace of devitrification—a perfect natural glass in fact. From determinations upon some nine specimens in my possession, the mean specific gravity is about 2·44. The glass fuses before the blowpipe without intumescence and in the closed tube it affords no water. When sliced through, it shows a compact interior, with merely one or two steam holes or cavities not much larger than pin-points. I add no more at present, as I hope to investigate them more fully in the future.

XVIII. Garnetiferous Gneiss, Block 10 Mine, 315-ft. level, Broken Hill, N.S.W.

This rock rather approaches a schist in its character. It is tough and compact, and has a sp. gr. of 2·71. It contains *quartz* in plenty. A good deal of *orthoclase* and *biotite* are also present. *Garnets*—both pink and green—form a fair amount of the rock; they are quite isotropic between crossed nicols. *Muscovite* and altered mica are present with the biotite. There is an accessory

constituent to be seen in the slide which is difficult to determine. It is rather like cordierite and is surrounded by alteration products, but it has rather a higher index of refraction than ordinary cordierite. The rock is moderately fine-grained and in parts has quite a pinkish color from the number of garnets present.

XIX. Tremolite Schist (with Garnets), Block 10 Mine, 1,450 ft. Level, Broken Hill, N.S.W.

This rock is of a schistose character. The hand specimen shows *tremolite*, *garnet*, and *biotite*. *Quartz* and *orthoclase* are present in grains; also garnets, which are cracked, drawn out, and are not isotropic, but show anomalous double refraction due to strain. *Biotite* is present, which is rather altered. It is also crushed and bent. *Tremolite* forms a large part of the rock, which is a good deal altered, rather friable, and has a sp. gr. of 2·94. *Muscovite* altered to a hydromica is present as a constituent. The garnets and biotite form layers in the mass. Many of the garnets, which are of a light pink color, are quite long and rolled out. The rock has undergone great strain.

The foregoing observations are perhaps little more than cursory remarks upon the specimens in question, but I hope they will suffice to indicate their general composition and character. Nos. II., III., IV., VIII., IX., XVI., and XVII. seem to present the most interesting points.

In conclusion, I have to acknowledge the kindness of Prof. J. W. Judd, F.R.S., who has afforded me, not only the opportunity of doing this work in the Geological Laboratory of the Royal College of Science, London, but every aid and facility for the carrying out of the same. The sections were cut by Mr. F. Chapman of the same institution.

A Supplement to a Census of the Flora of Extra-Tropical South Australia.

Compiled by Professor Ralph Tate.

[Read December 3, 1894.]

Now, after a lapse of a little more than five years, so many additions have been made to the "Census" published in these Transactions, Vol. XII., pp. 67-128, 1889, that it has been thought desirable to issue a supplemental list, and to include therein the emendations to the list of 1889.

The number of species has been increased by eight, but as five species have been eliminated from the "Census," the total gain is 76, making a grand total of 2,011. By these accessions one natural order, *Eriocauleæ*, and six genera, *Elacholoma*, gen. nov., Or. Pedalineæ, *Beaufortia*, *Eriocaulon*, *Phylloglossum*, *Psilotum*, and *Lygodium*, are now included in the "Census." Of the 81 additional species, 29 are new to science and 52 are extra-limital. The greater number of the additional species occur in the Eremian Region, and are largely the results of the expedition by Mr. Tietkens in 1889 (see Trans. Roy. Soc., Vol. XIII., pp. 94-109, 1890), of the Elder Expedition in 1891-2, and of the Horn Expedition in 1894 (the botanical results of which are not yet published). In the South-East extremity of this colony Mr. Eckert has discovered several Victorian species previously unknown on the western side of the Glenelg River, a number of the species are recorded in "Report Australasian Association for the Advancement of Science," Vol. V., p. 410, 1894, and the rest have been communicated by Baron F. von Mueller, who has also informed me of other provincial gains derived from other sources.

The following schedule summarises the general nature of the accessions, their distribution, and sources of information :—

Collectors.	New. Genera added.	Known.	Species added. New.	Known.	Total.
Eremian Region—					
Tietkens Exped. ...	–	1	8	11	19
Elder Exped. ...	–	–	2	4	6
Horn Exped. ...	1	1	8	14	22
Unparticularised ...	–	2	9	8	17
Euronotian Region—					
Eckert	–	1	–	11	11
Unparticularised ...	–	–	2	4	6
Totals ...	1	5	29	52	81

The index letters to the several districts are correspondingly those employed in the "Census" of 1889; but District F has been reduced, as the result of personal knowledge gained while attached to the Horn Expedition, by the extension of District C to about the latitude of Engoordina on the Finke-river.

The asterisk prefixed to the species-name indicates that the species represented is new to science.

I. Addenda.

*Capsella villosula, *F. v. M.* and *Tate, m.s. S.*, Arkaringa Valley, *Elder Exped.*

Capsella ochrantha, *F. v. M.*, subsequently regarded by that author as a yellow-flowered variety of *C. cochlearina;* but as it offers other trivial differences, which seem to be constant, it should be maintained as distinct. F, *Tietkens.* C, Arkaringa Valley, *Elder Exped.*

*Eriostemon argyreus, *F. v. M.* and *Tate* in Trans. Roy. Soc., S. Aust., vol. XIII., 1890. F, *Tietkens.*

Plagianthus pulchellus, *Gray.* G, *Eckert,* fide F. v. M. in Aust. Ass. Adv. Sc., vol. V., p. 140.

*Sida podopetala, *F. v. M.* and *Tate,* op. cit. F, *Tietkens, Horn Exped.*

Triumfetta micracantha, *F. v. M.* F, s.-w. of Finke-river, *Schwartz,* fide F. v. M.

Euphorbia Mitchelliana, *Boissier.* F, Tempe Downs, *Horn Exped.*

Claytonia spergularina, *F. v. M.* F, Finke-river, *Horn Exped.*

Scleranthus biflorus, *J. Hooker.* G, *Eckert,* op. cit.

Atriplex elachyphyllum, *F. v. M.*, in Frag. VII., p. 8, 1870; and Icon. Salsolaceæ, tab. 6. C, Crown Point and Adminga Creek, *Horn Exped.* S, Lake Weatherstone, *Tate.*

*Atriplex lobativalve, *F. v. M.*, in Icon. Salsol., tab. 6; and Vict. Nat., 1893. F, Marshall-river, *Winnecke.*

*Bassia Luehmanni, *F. v. M.*, in Vict. Nat., 1890; and Icon. Salsol. F, near Finke-river, *Schwartz.*

*Bassia Tatei, *F. v. M.*, in Vict. Nat., 1890; and Icon. Salsol. S, Lake Torrens Plain, east, *Tate.*

*Bassia longicuspis, *F. v. M.*, in Icon. Salsol., tab. 24; and Vict. Nat., 1893. C, Charlotte Waters, *Kempe.* S, Beltana, *Mrs. Richards.*

Threlkeldia proceriflora, *F. v. M.* C, Adminga Creek, *Horn Exped.*

Daviesia latifolia, *R. Brown.* G, *Eckert,* fide F. v. M.

Casuarina nana, *Sieber.* G, *Eckert,* fide F. v. M.

Crotalaria Novæ-Hollandiæ, *DeCondolle.* F, *Horn Exped.*

*Swainsonia cyclocarpa, *F. v. M.*, in Vict. Nat., 1892. F, MacDonnell Range, *Schwartz.*

Swainsonia canescens, *F. v. M.* F, MacDonnell Range, *Horn Exped.*

Acacia patens, F. v. M. F, *Kempe*, *Tietkens*, *Horn Exped.*; C, *Horn Exped.*

Acacia Meissneri, *Lehmann.* W, Fowler-Bay-district, *Tate.*

*Acacia frumentacea, *Tate*, *m.s.* F and C, Charlotte Waters and northward to Mount Sonder, *Horn Exped.*

*Acacia Cowleana, *Tate*, *m.s.* F, *Horn Exped.*

Acacia Bynoeana, *Bentham.* F, *Tietkens.*

Pimelea collina, *R. Brown.* G, *Eckert*, op. cit.

*Pimelea Husseyana, *F. v. M.*, *m.s.* A, Port Elliot, *Miss J. L. Hussey.*

Grevillea parviflora, *R. Brown.* G, *Eckert*, fide F. v. M.

Grevillea eriostachya, *Lindley.* F, *Horn Exped.* and (as G. chrysodendron) *Tietkens.*

Ammannia auriculata, *Will.* F, *Tietkens* and *Horn Exped.*

Leptospermum flavescens, *Smith.* G, *Eckert*, op. cit.

Melaleuca Leucodendron, *Linne.* C, between Eyre's Creek and Hergott, *fide F. v. M.*

Beaufortia elegans, *Schaur.* W, near Eucla, *G. R. Turner*, com. by F. v. M.

*Eucalyptus Lansdowneana, *F. v. M.* and *J. E. Brown* in "Forest Flora, S.A." W, Gawler Range.

Eucalyptus eudesmoides, *F. v. M.* F, *Horn Exped.*; C, Everard Range, *Elder Exped.*

Pomaderris vaccinifolia, *Reisseck* and *F. v. M.* A, Mount Lofty Range, *fide F. v. M.*

*Didiscus Gillenæ, *Tate*, *m.s.* F, Mount Gillen, *Horn Exped.*

Oldenlandia galioides, *F. v. M.* F, *Tietkens.*

Coprosma Billardieri, *Hooker.* G, *Eckert*, op. cit.

*Wedelia Stirlingi, *F. v. M.* and *Tate*, *m.s.* F, *Horn Exped.*

Aster orarius, *F. v. M.* G, near Glenelg River, *fide F. v. M.*

Vittadinia scabra, *DeC.* F, *Horn Exped.*

Calotis dentex, *R. Brown.* F, *Horn Exped.*

*Calotis latiuscula, *F. v. M.* and *Tate*, 1890. F, *Horn Exped.*; C, *Tietkens.*

Pluchea squarrosa, *Benth.* F, *Horn Exped.*

Erechthites lacerata, *F. v. M.* F, *Tietkens* and *Horn Exped.*; C, Everard Range, *Elder Exped.*

*Helipterum Jesseni, *F. v. M.*, in Vict. Nat., 1890. C, S, W, M, A, N, L.

*Helipterum Troedelii, *F. v. M.*, in Vict. Nat., 1890. S, Lake Torrens Plain east, *Tate.*

*Helipterum Fitzgibboni, *F. v. M.*, in Vict. Nat., 1890. F, *Thornton*, Kempe. C, *Tietkens*, *Horn Exped.*; W, *Batt.*

*Helichrysum phaceloma, *F. v. M.* and *Tate*, *m.s.* F, *Horn*

Exped. C, Everard Range, and also Cavenagh Range, W.A., *Elder Exped.*

*Goodenia Horniana, *Tate* and *F. v. M.*, *m.s.* F, George Gill's Range, *Horn Exped.*

*Goodenia subintegra, *F. v. M.*, in Vict. Nat., 1888, p. 12, previously included under *G. glauca.* F, C, Y.

*Goodenia fascicularis, *F. v. M.* and *Tate.* C, *Tietkens.*

*Ipomœa racemigera, *F. v. M.* and *Tate.* F, *Tietkens*, *Horn Exped.*

Polymeria ambigua, *R. Brown.* F, "region at the tropic of Capricorn," *F. v. M.*

Halgania integerrima, *Endlicher.* F, *Tietkens.*

Cynoglossum latifolium, *R. Brown.* G, *Eckert*, op. cit.

Styphelia Mitchelli, *F. v. M.* F, Mount Sonder, *Horn Exped.*

*Teucrium grandiusculum, *F. v. M.* and *Tate.* F, *Tietkens.* C, Birksgate Range, *Elder Exped.* W, Ooldea, *Tate.*

*Prostanthera Schultzii, *F. v. M.*, *m.s.* F, Mount Sonder, *Schultz*, *Horn Exped.*

*Elacholoma Horni, *F v. M.* and *Tate*, *m.s.* F, *Horn Exped.*

Newcastlia chrysotricha, *F. v. M.* C, Everard Range, *Elder Exped.*

Eremophila viscida, *Endlicher.* C, *Tietkens.*

Pterostylis Mackibbini, *F. v. M.*, in Vict. Nat., 1892. A, near St. Vincent Gulf, *F. v. M.* (1848).

*Prasophyllum Fitzgeraldi, *Dean*, *m.s.* A, Mount Lofty, *Fitzgerald.*

Xerotes sororia, *F. v. M.* A, St. Vincent Gulf, *F. v. M.*

*Xanthorrhœa Thorntoni, *Tate*, *m.s.* F, *Horn Exped.*

Juncus Brownii, *F. v. M.* G, *Eckert*, op. cit.

Triglochin calcitrapa, *Hooker* (= T. centrocarpa, pars). F, C, *Horn Exped.*

*Eriocaulon graphitinum, *F. v. M.* and *Tate*, *m.s.* F, *Tietkens.*

Fimbristylis acuminata, *Vahl.* F, *Tietkens.*

Heleocharis capitata, *R. Brown.* F, Palm Creek, *Horn Exped.*

Triraphis pungens, *R. Brown.* F, *Horn Exped.*

Triraphis bromoides, *R. Brown.* C, *Elder Exped.*

Phylloglossum Drummondii, *Kunze.* G, *Eckert*, op. cit.

Psilotum triquetrum, *Swartz.* F, George Gill's Range, *Horn Exped.*

Lygodium reticulatum, *Schkuhr.* F, *fide F. v. M.*

Adiantum hispidulum, *Swartz.* F, George Gill's Range, *Horn Exped.*

Asplenium Trichomanes, *Linn.* G, *fide F. v. M.*

Aspidium unitum, *Swartz.* F, George Gill's Range, *Horn Exped.*

Aspidium aculeatum, *Swartz.* G, *fide F. v. M.*

II. Corrigenda.

Hybanthus miniatus in list of Tietkens' plants is a mere *lapsus calami* for *H. aurantiacus* = *H. enneaspermus.*

Geijera salicifolia, *Schott*, is not that species, but *G. pendula*, Lindley, which by F. v. M. is reduced to a variety of *G. parviflora.*

Micrantheum hexandrum, *Hooker.* The South Australian plant, quoted under this name, is a distinct species and has been described by F. v. M., in Vict. Nat., 1890, as *M. demissum.*

Phyllanthus minutiflorus in the Tietkens'-collection proves to be immature *P. rhytidospermus.*

Atriplex holocarpum, *F. v. M.*, is a variety of *A. spongiosum.*

Kochia pentatropis, *Tate*, is now reduced to *K. decaptera.*

Bassia Cornishiana, *F. v. M.*, is reduced to a varietal state of *B. Birchii*, F. v. M.

Bassia bicuspis, *F. v. M.*, is a somewhat aberrant form of *B. tricuspis.*

Gomphrena Brownii, *Moquin*, is a synonym of *G. lanata*, Brown.

Lespedeza lanata, *Bentham*, is not actually known within extra-tropical South Australia, "but reaches near to the boundary," *F. v. M.*

Eremophila Tietkensi, *F. v. M.* and *Tate*, is only a broad-leaved canescent variety of *E. Latrobei.*

Crinum angustifolium, quoted from the Macdonnell Range, belongs to *C. flaccidum.*

Crinum pedunculatum from the River Murray region belongs also to *C. flaccidum.*

Thelymitra rubra, *Fitzgerald*, is identical with *T. Macmillani*, F. v. M., which is the older name.

Descriptions of New Species of Marine Mollusca of South Australia.

By Jos. C. Verco, M.D., Lond., &c.

[Read May 7, 1895.]

Murex Tatei, *spec. nov.* Pl. ii., fig. 2, 2a, 2b.

Shell squarely pyriform, light, porous. Spire less than one-third the length of the shell. Nucleus conspicuous, papillate, one turn and a half, smooth, deep purplish-black, suture somewhat channelled.

Spire-whorls four, convex, roundly shouldered at the upper part; varices not quite regularly disposed, some continuous with those on adjacent whorls others not, well marked, breadth rather greater than height, rounded and reflected slightly, most prominent above the shoulder. Regularly disposed spiral liræ; six on the penultimate, fewer on the posterior whorls, about as high and as wide as the interspaces. These are completely covered with very regular thin close-set erect longitudinal laminæ, very uniformly corrugated, so that between the liræ they are straight, and on the liræ are semicircular, with the convexity to the right. These semicircular corrugations are so uniform that their sides, which touch, seem to form thin spiral vertical plates with a longitudinal scalloping between, giving the shell an appearance of being covered with coral, or chain-stitch crochet work which is continuous over the varices.

Body-whorl ventricose, roundly angulated at upper part, nearly flat above this, sloping with slight convexity below, markedly contracted at midpoint between the suture and anterior extremity of canal. Varices five, about one to one and a-half lines wide and a line high, highest behind the shoulder. About 20 spiral liræ, alternately higher and lower, covered with the same crenulated longitudinal laminæ as the spire. Aperture obliquely oval, very slightly contracted anteriorly. Outer lip simple, finely crenulated, and lirate for a line within. Outside thickened to two lines by about nine superposed scallopings, corresponding with the crenulations of the lip. Inner lip distinct, on the arcuate columella, continuous behind with the outer lip, smooth, thin, inflected at the lower part of the aperture, so as to partly cover the canal. Canal slightly longer than the aperture, nearly straight, deflected first to the left, then straight, then to the left, almost closed; shortly and sharply recurved at the an-

terior extremity. Color greyish-white. Reddish-brown inside from suture to shoulder, indistinctly visible outside in the interstices of the crenulations. Operculum horny, nucleus apical, anterior.

Length, 15 mm.; breadth between the varices, 7·5—including them, 9·5. Length of aperture, 5 ; breadth, 3 ; of canal, 6 ; of spire, 4 mm. One broken shell has an aperture of 5·5 mm. long, and a canal of 8 mm.

No Murex known to me so resembles it as to require a diagnosis.

Habitat.—Backstairs Passage, S.A. Dredged in 20 fathoms, one alive ; 17 fathoms, one alive immature ; 22 fathoms, one recent ; ? depth, seven dead, three recent *(J. C. Verco)*.

Type specimen in my collection. I have named it after the well-known President of the Royal Society.

Murex (Poropteron, *Jousseaume*, 1880) **robustus,** *spec. nov.* Pl. ii., figs. 3, 3*a*.

Shell ovate trigonal, solid, spire not quite so long as body whorl. Whorls six, exclusive of nucleus. Nucleus slightly papillate one and a-half turns, dextral. Spire-whorls subconvex, nearly smooth. Sutures distinct, simple. Varices three, regular, almost continuous, each just behind that on the previous whorl, and ending posteriorly in a sinuous, stout, roundly-trigonal tube, directed towards the apex of the shell. On the left side of the varices are short, stout, spiral buttresses, three on the penultimate, from the lower suture to the base of the tube behind. Body-whorl convex, scarcely shouldered above. Varices three, low and stout, ending close to the suture in a tube, trigonal in section, stout and sinuous, like a horn, extending backwards, hollow, rugose, and showing the scar of closure, just to the left of the anterior edge. Surface of whorl rather rugged, with five or six obsolete spiral liræ, and sublenticular very fine, incised, longitudinal growth-lines. Aperture oval, slightly oblique, small, entire ; peristome projecting as a thin, detached, simple, sharp lamina, from $\frac{1}{4}$ to $\frac{1}{2}$ mm. On the outside of the outer lip are six rounded, tubular, spiral ribs, extending to the margin of the varix (forming the "buttresses" of the varices on the spire) ; the most anterior is very short, and ends in the scar of the canal. Columella invisible. Canal completely closed ; length just longer than the aperture ; at its anterior end bent at a right angle, and then curved slightly to the right, with a capillary opening from a little behind the bend to the extremity, numerous fine, incised, longitudinal sinuous lines on its basal aspect. Labial varix saw-like, with nine forward-curved, claw-like processes ; the central ones terminate the obsolete spiral liræ of the whorl, and from

their under surfaces give off five of the buttresses of the apertural lamina. About five small tubercles continue the series posteriorly on the proximal part of the variceal tube. Operculum horny, ovate, nucleus apical anterior. Ornament, in very young specimens, a chestnut-brown spiral line at the base of the variceal tube, and a second about the level of the lower end of the aperture.

Length, 14·25; breadth, 5·5 between the varices, 7 including them; spire, 6; body-whorl, 8·25; length of aperture, 3; width, 2; length of canal, 3·75 mm.

Habitat.—Backstairs Passage, 22 fathoms, three alive, and St. Vincent's Gulf, dredge siftings, ? depth or exact locality, 25 dead and alive of various sizes *(J. C. Verco)*.

Type specimen in my collection.

It bears a superficial resemblance to *M. Angasi*, Crosse, but this is a narrower thinner shell, with a single curved (not sinuous) and open posterior variceal hook, an open anterior canal, and a simple aperture.

This shell resembles a *Typhis* in its sinuous posterior tube; but the variceal origin of the tube separates it from all the species of that genus, in which the canal is inter-variceal.

It differs from *T. triangularis*, A. Ads., in the absence of spiral liræ, and the closed straight canal. From *T. Japonicus*, A. Ads., = *T. arcuatus*, Hinds., in having no arched varices, no pseudo-varices, and its tubes not truncated From *T. cancellatus*, Sow., in the very narrow varices along the canal.

Trophon angustus, *sp. nov.* Pl. i., fig. 5, 5a.

Shell fusiform, sordid-white, lamellosely varicose; whorls six or seven, including the nucleus. Nucleus one turn and a-half, smooth, polished, blunt. Spire subturreted, whorls moderately convex, varices slightly higher than wide, six in each whorl; two or three broad obsolete spiral liræ, most marked just beyond the varices. Body-whorl slightly convex, contracted somewhat anteriorly; about five broad subraised spiral liræ, with two to five intervariceal longitudinal liræ, dividing the intervariceal areas into square spaces of varying size. Varices six, sinuous, posteriorly shortly convex to the right, straight in the middle, anteriorly openly and markedly concave to the right, in apposition over the dorsum of the canal; the last-formed rather higher than wide, but easily worn down; so that the earlier ones are wider than high, higher and narrower anteriorly. Aperture elongate-ovate, enamelled internally; outer lip varicose; columella arcuate, distinctly angled at junction with canal; inner lip thin, anteriorly slightly separate from columella, and very slightly curving over the canal; canal bent to the left,

moderately open, reflected, and notched. The shell has an inner hard enamel-like layer, and an outer of soft, porous, chalky consistence. This when perfect is nearly smooth, longitudinal and transverse markings being scarcely visible. When slightly denuded coarse and fine longitudinal lines become evident; when more denuded those are less marked and spiral ones are more manifest, numerous spiral incisions running along the broad liræ; and when the enamel only remains there are four or five subraised principal spiral liræ, with abundant fine interstitial striæ, but no longitudinal intervariceal markings.

Length, 10 mm.; breadth, including varices, 4·25 mm.; length of spire, 5; of aperture, 2·5; breadth, 1·5.

Habitat.—St. Vincent Gulf; dredged in deep water, three individuals *(J. C. Verco)*.

Type specimen in my collection.

From *T. Goldsteini*, Ten.-Woods, it is more slender *(T. Goldsteini* is 11·5 to 6, with the outer covering intact); varices are more arcuate and more approximate; whorls less angulate, less ventricose.

Trophon levis, *sp. nov.* Pl. ii., fig. 5, 5a.

Obliquely ovate-fusiform, thin, sordid-white. Whorls seven. Nucleus indistinct, one turn and a half, slightly excentric. Spire elevated, acute, shorter than last whorl, as 12·25 to 17·5. Whorls nearly flat, sloping, obtusely angulated at lower third, sutures indistinct, shoulder with distant tubercles vanishing about middle of penultimate whorl, most marked at its commencement. Body-whorl subventricose, uniformly rounded, somewhat constricted at the base; nine low, broad, rather rude longitudinal costations at irregular distances; obsolete broad flat spiral elevations, broadest and lowest about the periphery, narrower and more valid anteriorly, where also longitudinal incremental striæ are most marked; suture moderately distinct, irregular, crenulated in places by the ends of obsolete incremental lines. Aperture elongately oval, contracted posteriorly, opening widely into the canal in front; outer lip simple, thin, with wide shallow crenulations corresponding with the spiral liræ. Columella smooth, arcuate, slightly excavated; callus thin, spreading a little over the base, especially behind. Umbilicus rimate. Canal short, widely open, subsinistral, scarcely recurved, hardly notched. There is a complete, thin, soft chalky coating which smears and obscures the sculpture, but is evidently not an adventitious deposit. Three dark blackish-purple bands about a line in width visible inside the outer lip, in the posterior half of the aperture, the lowest one at its middle; two more, indistinct, at the junction with the canal, and two narrow and scarcely visible behind these. They lie between the spiral liræ. Operculum muricoid. Dentition, pl. iii., fig. 3, muricoid.

Length, 27·5 mm.; greatest breadth, 16 mm.; length of aperture and canal, 17·5 mm.; greatest width, 7 mm.

Habitat.—Backstairs Passage, S.A. Dredged alive in 22 fathoms; one example in my collection.

From *T. Flindersi* it differs by being much thinner, narrower, spire more acute, whorls less angulated, outer lip thin, not denticulated, columella not so excavated, umbilicus smaller, canal more open; surface much less sculptured. *T. Flindersi* is a littoral shell. *T. levis* was dredged in deep water. It is possibly only an extreme variety resulting from its very different station.

Triton mimeticus, *Tate* (Sipho ?). Pl. 2, figs. 4, 4*a*.

In the Proc. Roy. Soc. of S.A. for June, 1893, p. 189, Prof. Tate described a shell which he referred provisionally to *Sipho*, recognising it as probably immature, and as needing further material to determine its generic location. This material has been furnished by two more specimens dredged by me in Investigator's Straits, one of which is slightly less immature than the type, and the other has formed two varices, and so established its position as a *Triton*. It is an interesting form in two respects, viz., the comparative length of its canal, and the delay in forming its first varix until about four and a-half whorls have been completed. I have given below a full description of the shell.

Shell ovately-fusiform, imperforate, rather thin. Whorls nearly six. Spire moderately elevated, one-third the length of the shell, as 7 to 21; whorls 5, including nucleus. Nucleus one turn and a-half, slightly oblique, apex nearly flat and forming a sharp angle with the short steep side in the first turn; second turn subconvex. Spire-whorls, the first slightly and medially angulated, the second with a marked shoulder at first median, but gradually approaching the suture, which it reaches about the middle of the third spire-whorl and runs in apposition with it for the third of a revolution, when the first varix is formed, and the suture sinks again to reascend just before the next varix is produced. Suture distinct. Whorls subconcave behind the shoulder, with spiral liræ, increasing in number with the size of the shell, about six in the penultimate and two interstitial threadlets; liræ rounded, narrow, about half the width of the interspaces; longitudinal growth-lines at unequal intervals, making the spiral liræ somewhat moniliform; obsolete longitudinal costæ, most marked at the angle, where they produce a row of tubercles, 15 on the penultimate whorl. Body-whorl large, angulation well-marked, with less pronounced carina in front, so as to divide the whorl into three equal parts; concave behind the angulation, flat and sloping to carina, excavated

anterior to this. Seven well-marked, acute, rounded tubercles on the shoulder on the dorsal aspect, none on the ventral, present but much less valid on the carina. Spiral liræ eleven behind the angle, eleven to carina, and 22 to end of canal; sublenticular growth-lines, no longitudinal costæ; ventral surface very flatly convex, shoulder obsolete, carina absent, no tubercles, liræ faint. Aperture obliquely oval, sharply marked off from the canal; columella arcuate, inner lip thin, distinct, joining outer lip behind, and forming a minute sinus with it by means of a small tooth-like spiral callus. Outer lip thickened by an ascending external varix, bevelled inside to a sharp margin, seven or eight teeth internally, the anterior three or four doubled.

Length of aperture, 8·5 mm.; breadth, 6·5 mm.; canal, 5·5 mm., almost closed, curved obliquely to the left, slightly recurved. Ornament, irregular rusty blotches, with articulated rusty spots on carina. Total length, 21 mm.; breadth, 11·25.

Habitat.—Dredged, Tapley's Shoal, 12-16 fathoms. One, immature, dead *(Mr. Matthews)*. Investigator's Straits, 15 fathoms, one dead; 20 fathoms, one immature, dead *(Verco)*.

From *T. Bassi* it differs by spire more acute, nucleus much smaller, more acute and angled, varix later formed (in *T. Bassi* after three or three and a-half turns), whorls more angled and tuberculate, canal longer.

Latirus aurantiacus, *sp. nov.* Pl. ii., fig. 1, 1a.

Shell ovate-fusiform, very solid. Spire elevated, shorter than the aperture. Whorls six, without the nucleus which is wanting; rather convex, roundly angled just below the middle, and provided with eight or nine rounded well-marked nodules, about equal in width to the intervals, and costate in the lower half of the whorls. Spiral liræ eight to ten, distinct, varying in size, devious, about equal in width to the interstices, and crossed by longitudinal rather distant scabrous lines of growth. Suture distinctly marginate, sinuous, ascending between the costæ, edge crinkled by imbricating growth lines. First and second whorls nearly destroyed by fine borings. Last whorl subventricose, shouldered at six lines from the suture, very slightly concave above, convex below, narrowing rapidly to its minimum at the middle point of the ventral surface; with nine very valid longitudinal costæ, flatly rounded, rather wider than the interspaces, highest at the shoulder, which abruptly points them, very slightly marked above the shoulder, gradually narrowing and subsiding below, to disappear at the middle of the base. Well-marked spiral liræ sub-equidistant (16 in the whorl), with an occasional spiral thread between the more distant (four in the whorl). Above the shoulder the liræ, five in number, are narrowest;

below it they gradually increase in size anteriorly, rounded, not quite as wide as the interstices. Whole surface roughened by close-set (two to the line) sub-vertical, imbricating, crinkled, incremental laminæ. Suture rather widely margined, sinuous, generally ascending between the costæ, conspicuously crinkled by longitudinal laminæ. Umbilicus small, partly covered by the inner lip, which is somewhat reflected into it, left margin slightly corrugated by varix of the notch. Columella nearly straight in its lower half; three distinct equal plaits, slightly oblique, the lowest corresponding with the prolongation backwards of the varix of the apertural notch. Aperture obliquely ovate, an inconspicuous narrow ascending posterior sinus formed by the marginate suture. Canal about one-third of the whole aperture, open, wide, slightly deviated to the left, notched anteriorly, very slightly recurved. Outer lip acute, thin, a little everted, due to incipient formation of a costa, crenated by the spiral liræ of the whorl, which also form sulcations within; internally of a deep salmon color at the margin, fading into the polished bluish white throat, and with somewhat darker red lines in the lirate depressions. Inner lip thin, a little spread over the columella, and partially occluding the umbilicus, of a glistening pearly-white color with a rusty tinge, especially between the plaits and near the upper part of the aperture. Ornament, a rusty salmon color most marked near the margin of the aperture, nearly hidden elsewhere by some green adventitious deposit. Operculum ovate, acute, nucleus at anterior apex.

Length, 46 mm.; greatest breadth, 27 mm.; length of aperture, 27 mm.; width, 10 mm.; of spire, 19-20 mm.

Habitat.—Backstairs Passage, S.A.; 18½ fathoms, dredged alive, one individual in my collection.

The shell most allied appears to be *L. concentricus*, Rve. My shell is not so thick, the costæ and liræ are more numerous and not so valid; the last whorl is longer relatively to the spire.

Latirus Pulleinei, *spec. nov.* Pl. i., fig. 1, 1*a*, 1*b*.

Shell elongately-fusiform, moderately thick. Whorls eight; nucleus absent from all the specimens (eight). Spire elongated, whorls regularly convex, with spiral liræ (on the penultimate six primary, and four smaller intermediate in the anterior part), acute, about one-third as wide as the interspaces, crossing over inconspicuous longitudinal rounded costellæ (15 on penultimate whorl), as wide as the intervals. Sublenticular longitudinal incremental striæ not crossing the liræ. Suture distinct, slightly marginate. Last whorl regularly convex, with about 22 acute spiral liræ, and eight interstitial striæ gradually becoming stouter anteriorly until they are as valid as the liræ; obsolete

longitudinal curved costellæ above the periphery, becoming gradually less conspicuous until they disappear, remaining longest close to the suture; near the aperture in a large example they reappear. Aperture obliquely-elongately-oval, descending into the canal, pinched into a tiny furrow posteriorly by the marginate suture. Outer lip simple, slightly sinuous, thin, finely crenated, obsoletely lirate internally. Columella subarcuate, sub-convex at the beginning of the canal; only a trace of callus, except anterior to the varix of the notch where it is subconcavely reflected, and forms a minute rimate umbilicus. The spiral liræ are almost quite obliterated at the inner lip, and three sub-raised thread-like plicæ are visible deeper in the throat, equal and equi-distant, and with the same obliquity as the spiral liræ, the highest at the centre of the aperture; sometimes a fourth exists close below them. Canal nearly as long as the aperture, sub-concave lengthwise along its left border, in the same sinistral oblique line as the aperture, wide, open, scarcely notched. Ornament, curved longitudinal rust-brown streaks on the summit of the costæ, sometimes broken into dots on the spiral liræ; at irregular distances on the body-whorl, and slightly sigmoid; crowded into a rusty area on the varix of the notch.

Total length, 51·5 mm.; greatest diameter, 19·5; length of aperture, 15·5; width, 6·5; length of canal, 11 mm. The relative lengths of the last whorl (including aperture and canal) and the spire vary slightly in individuals of the same size, and as the shell grows, the spire, which is at first shorter than the last whorl, becomes longer than it, as shown in the following series :—

Spire	7·75,	whorl	9·75,	as	79·5	to	100.
"	11·75,	"	14·25,	"	82·4	"	
"	13·5,	"	16·,	"	84·4	"	
"	19·,	"	22·25,	"	85·4	"	
"	28·,	"	26·25,	"	106·9	"	

L. Walkeri of J. C. Melville, Proc. Malac. Soc. Lond., 1895, vol. I., No. 5, p. 221, pl. xiv., fig. 9, from Cossack, W. Australia, approaches it, but that shell is smaller, length 25 mm., more solid, costæ about half as numerous and more valid, suture not marginate, aperture with a distinct continuous inner lip, a thick everted or bevelled outer lip, and a more abrupt origin of the canal from the aperture. The above diagnosis is constructed from his plate and rather short description.

Habitat. — Eyre's Sand-patch, West Australia, many dead, *Mr. Pulleine* (after whom the shell is named), and *Verco;* Largs Bay, St. Vincent's Gulf *(D. J. Adcock);* subfossil, dredgings from Port Adelaide *(Dr. Perks).*

Crassatella producta, *sp. nov.* Pl. i., fig 2.

Shell compressed, solid, ovately-trapezoidal, equivalvular, inequilateral. Umbos conspicuous, acute, apposed, very slightly retroflected. Post-dorsal margin gently sloping, concave for one-fifth of its length next to the umbo, then almost straight; front dorsal margin scarcely convex, rapidly descending. Ventral margin nearly parallel with the post-dorsal, slightly approximating behind, uniformly subconvex, regularly rapidly curving upwards to form an almost circular anterior extremity; slightly ascending to join at a rounded angle the posterior margin. This is straightly truncated, nearly as long as the post-dorsal line in young specimens, about three-fourths in old ones, joining it at an obtuse angle of about 120°. Lunule long linear-lanceolate, smooth bevelled edges; right valve slightly including left; escutcheon, from the umbo almost the whole length of the post-dorsal margin, lanceolate, twice as wide as lunule, concave sides, sublenticular longitudinal striæ, left valve slightly overlapping the right. Well-marked post umbonal ridge to postero-ventral angle; surface flat behind it, subconvex elsewhere; markedly concentrically sulcated, seven ridges in the last five lines from the ventral margin, stout, acutely rounded, smooth (but for few microscopic incised lines, especially on their ventral sides), about equal in width to the interstices, which contain from one to three threadlets; straight behind the umbonal ridge and nearly parallel with the margin of the truncated posterior end, but with the angle at the ridge more open and rounded in the earlier ridges. Internally: right valve, triangular cartilage pit behind a single narrow triangular tooth, with a shallow triangular notch in it; lateral teeth, anteriorly a long linear furrow, the inner plate slightly triangularly projecting anteriorly, posteriorly the base of the escutcheon scarcely projecting and sharp; left valve, two cardinal teeth, diverging, anterior triangular stout and prominent with a long shallow triangular groove, posterior thin and lamellar; lateral teeth, anteriorly base of lunule slightly projecting and sharp, posteriorly a long linear furrow, inner plate slightly triangularly projecting at the posterior part. Ventral margin finely denticulated about half a line within the extreme edge, more minutely towards front lateral tooth, posterior truncated margin smooth. Ornament, light terra-cotta outside, deeper colored at the umbo, some specimens with many pink radiating lines of varying width from umbo to margin, and growing wider; some individuals pure white. Internally smooth, shining, white to deep flesh tint.

Dimensions, antero-post diameter, 10·25 mm.; umbo-ventral, 7·75; post-dorsal margin, 5·75; posterior, 3·5; depth of closed valves, 3·25.

Habitat.—Backstairs Passage, off Hog Bay, 16 to 18 fathoms, three valves; 20 fathoms, 17 valves; 22 fathoms, one alive, five valves; depth not noted, seven alive, 295 valves *(Verco.)*

Type specimens in my collection.

Crassatella micra, *sp. nov.* Pl. i., fig. 3.

Shell trigonally orbicular, rather compressed, equivalvular subequilateral, solid. Umbos acute, apposed, anteflected. Post-dorsal margin very short, at first convex, then almost straight, very rapidly descending; front dorsal margin minutely excavated close to the umbo, then rapidly descending, almost straight; the two margins form rather more than a right angle with each other. Ventral margin acute, uniformly convex, about a quadrant, ascending roundly into the posterior margin, and rather more narrowly into the anterior. Lunule rather large, elongate-ovate, somewhat indistinct, left valve slightly overlaps the right. Escutcheon linear-lanceolate, edges rounded, right valve includes the left. Surface flatly convex, deeply concentrically sulcated, seven ridges in the last three lines from the ventral margin, smooth, flatly-rounded, rather wider than the interstices, and not quite so high as wide. Internally, right valve, triangular cartilage pit behind a well-marked, triangular, cardinal tooth, in front of this is a short, vertical diverging tooth-like plate, in which ends the inner lamina of the anterior lateral tooth socket; anteriorly is a linear groove, most marked at its front end, where the inner lamina projects slightly; the post-dorsal margin lightly projects in a tooth-like lamina; left valve, triangular cartilage pit, behind two diverging cardinal teeth, the anterior of which is the more oblique, prominent and stout; base of lunule slightly prominent to form an anterior lateral laminar tooth; posteriorly a long linear groove, with barely visible projection of inner lamina beyond the level of the outer; inner margin not denticulated. Color light-horn tint, some specimens white with horn-tint about the umbo.

Dimensions, anterior-post diameter, 6 mm.; umbo-ventral, 5·5; depth of closed valves, 2·5 mm.

Habitat.—Backstairs Passage, St. Vincent Gulf, S.A.; dredged 20 fathoms, one alive; 22 fathoms, one alive; dredge siftings, depth not noted, probably about the same, six alive, 184 valves *(Verco)*. Type in my collection.

C. fulvida, Angas, from Port Jackson, is allied, but is a transversely oval shell, being more produced anteriorly, much thinner and with proportionally fewer and stouter concentric ridges.

EXPLANATION OF PLATES.

Plate I.

Fig.
1, 1a. Latirus Pulleinei, *Verco;* 1b. Details of sculpture.
2. Crassatella producta, *Verco.*
3. Crassatella micra, *Verco.*
4, 4a. Trophon Goldsteini, *Ten.-Woods.*
4b. Without its external coating, showing well-marked color bands.
5, 5a. Trophon angustus, *Verco.*

Plate II.

1, 1a, 1b. Latirus aurantiacus, *Verco.*
2, 2a. Murex Tatei, *Verco.*
2b. Details of sculpture.
3, 3a. Murex robustus, *Verco.*
4, 4a. Triton mimeticus, *Tate.*
5, 5a. Trophon levis, *Verco.*
6. Typhis Yatesi, *Crosse.*

Plate III.

1. Radula of Trophon Flindersi, *Ads.*, and *Ang.*
2. Radula of Trophon Assisi, *Ten.-Woods.*
3. Radula of Trophon levis, *Verco.*
4. Radula of Fusus australis, *Quoy.*
5. Radula of Fusus pyrulatus, *Reeve.*
6. Radula of Fusus Dunkeri, *Jonas.*
7. Radula of Fusus Lincolnensis, *Crosse.*
8. Radula of Fasciolaria coronata, *Lam.*
9. Radula of Siphonalia dilatata, *Quoy.*

A Revision of the Recent Gasteropods of South Australia.

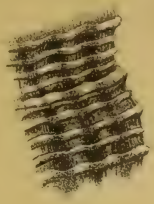
Part I.

By Jos. C. Verco, M.D., Lond., F.R.C.S., Eng., &c.

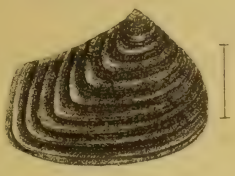
[Read May 7, 1895.]

It is proposed in the present paper to enumerate in order the species of the Families Muricidæ, Tritonidæ, and Fusidæ, as a contribution towards a complete catalogue of the recent gasteropods of the Province of South Australia. Several circumstances have of late favored such an effort. (1.) The issue by Mr. D. J. Adcock in 1893 of "A List of Species of Aquatic Mollusca of South Australia," which provided local collectors with as accurate a catalogue of our shells as was then available. It has proved of considerable value, by enabling each conchologist to discover roughly what species he possessed not included among our known fauna. (2.) The formation of the Malacological Section of the

1



1b



2

1a

3

4

4a

5

6

6a

H. B. lith.

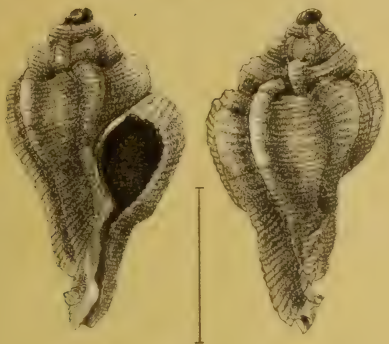
HUSSEY & GILLINGHAM LITH.

1

1b

1a

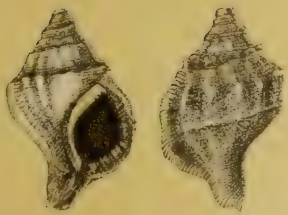
2b



2 2a

3

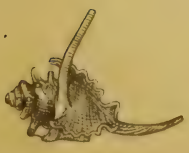
3a



4 4a

5

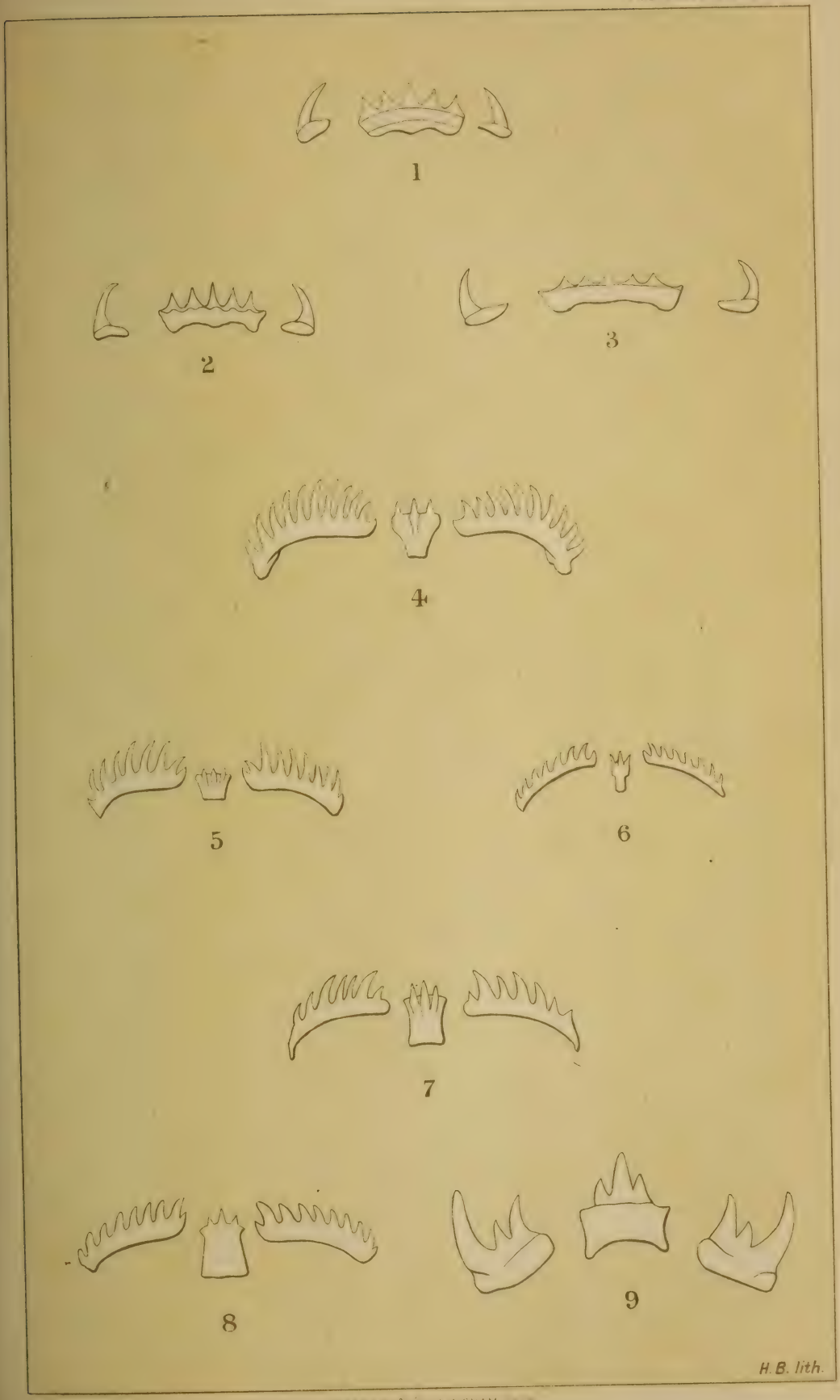
5a



6

H B lith

HUSSEY & GILLINGHAM, LITH



HUSSEY & GILLINGHAM

Royal Society. At its monthly meetings the species named in the above list have been critically discussed seriatim with the aid of specimens from the cabinets of its several members, and my thanks are here heartily tendered to the Section for permission in this paper to use the material which has been so carefully collated by its Honorary Secretary, Mr. R. H. Pulleine. (3.) Dredgings in the deeper waters of St. Vincent and Spencer Gulfs, which have been undertaken during the last five or six years, have supplied many new and interesting forms, as well as living or recent specimens, in considerable numbers, of species previously described. (4.) The examination of the odontophore from several of these molluscs.

The following plan will be pursued, as far as the material and literature at our disposal will permit. The name of each species in our waters will be given with a reference to the work in which it was described, that name being chosen which has priority in point of time. Synonyms, with their references, will be enumerated. The places where it is found in South Australia will be given, with the depth in fathoms, when known. Any information beyond that contained in the original description will be added.

If readers notice any omissions or inaccuracies, and will intimate the same to the writer of this article, he will be pleased to acknowledge them with thanks, and will endeavor to incorporate them in subsequent communications to the Society's Proceedings.

FAMILY MURICIDÆ.

Genus Murex.

1. M. triformis, *Reeve.*

Reference.—Proc. Zool. Soc., 1845, p. 87. Conch. Icon. sp. 53.

Habitat.—Common throughout the whole coastline of South Australia. Also King George Sound, W.A., Victoria, and Tasmania, where, however, the specimens are much smaller. Most abundant, alive, in water from 5 to 10 fathoms, but it is found at all depths up to 22 fathoms *(J. C. Verco).*

2. M. Angasi, *Crosse.*

Reference.—Typhis Angasi, Jour. de Conch., 1863, vol. XI., p. 86, t. 1, fig. 2.

Type specimen from Port Jackson, N.S.W.

Syn.—M. eos, Hutton, New Zealand. Tryon Man. of Conch., vol. II., p. 88. *M. zonatus,* Ten.-Woods, Proc. Roy. Soc. Tasm., 1876, p. 132.

Habitat.—Encounter Bay, Spencer Gulf, St. Vincent Gulf, Investigator Straits.

Dredged alive, 13 fathoms, 1 ; 15 fathoms, 1 ; 17 fathoms, 2. Dead from 13 to 22 fathoms *(J. C. Verco)*, Tasmania.

3. M. umbilicatus, *Ten.-Woods. (Trophon umbilicatus).*

Ref.—Papers and Proceedings of the Royal Society of Tasmania, 1875-76, p. 135.

Syn.—*M. scalaris*, A. Adams (*non* Brocchi), Proc. Zool. Soc., 1853, p. 71.

Tryon in his Man. vol. II., p. 155, has placed it in *Urosalpinx*, which he defines as having a purpuroid operculum. But this species has a muricoid operculum, and belongs to the genus *Murex*. It was formerly confounded with *M. octogonus*, Quoy, Voy. de L'Astrol., 531, t. 36, figs. 8, 9.

Type specimen from the E. coast of Tasmania, uncommon.

Hab.—Spencer Gulf, St. Vincent Gulf, Backstairs Passage, Encounter Bay.

Dredged alive, 8 fathoms, 1 ; 12 fathoms, 2 ; 13 fathoms, 1 ; 14 fathoms, 2 ; 17 fathoms, 1 ; 19 fathoms, 2 *(J. C. Verco)*.

4. M. Brazieri, *Angas.*

Ref.—Proc. Zool. Soc., 1877, p. 171, pl. 26.

This was formerly confounded with *M. polypleurus*, Brazier.

According to Angas, it is somewhat allied to *M. mundus*, Reeve ; and according to Brazier, in Proc. Linn. Soc., N.S.W., vol. VIII., pt. I., *Trophon tumidus*, Petterd, is a synonym.

Hab.—Spencer and St. Vincent Gulfs, Investigator Straits, and Backstairs Passage *(J. C. Verco)*, Encounter Bay *(D. J. Adcock)*.

Type specimen, Port Jackson Heads, 20 fathoms. Dredged alive, 17 fathoms, 1. Dead at 17, 19, and 22 fathoms, several. Many alive and dead in deep-water dredge-siftings *(J. C. Verco)*.

5. M. serotinus, *A. Adams.*

Ref.—Proc. Zool. Soc., 1851, p. 268.

Syn.—*M. Blainvillei*, Payr., a Mediterranean form, according to Sowerby.

Hab.—One specimen, obtained alive, amongst the rocks at low water, spring tides, Aldinga Bay *(Angas)*.

No other collectors have taken it in Australia.

6. M. polypleurus, *Brazier.*

Ref.—Proc. Linn. Soc., N.S.W., vol. VIII., 1894, part II., p. 179.

This was formerly known here as *M. pumilus* of A. Adams, but proves to be quite a distinct shell. Brazier refers it to the subgenus Pseudo-Murex, Monteserato, 1872.

Hab.—Several alive and dead in deep water in Spencer and St. Vincent Gulfs, depth not measured *(J. C. Verco)*.

7. M. Tatei, *Verco.*

Ref.—*Antea*, p. 84.

Hab.—Backstairs Passage, S.A. Dredged alive in deep water *(J. C. Verco).*

8. M. robustus, *Verco.*

Ref.—*Antea*, p. 85.

Hab.—Investigators Straits; deep water, several alive and dead *(J. C. Verco).*

Genus Typhis.

T. Yatesi, *Crosse.*

Ref.—Jour. de Conch. XIII., 1865, p. 54, pl. ii., fig. 3.

Type specimen, St. Vincent Gulf, S.A.

Hab.—Backstairs Passage, Spencer and St. Vincent Gulfs.

Dredged 15 fathoms, 1 alive; 17 fathoms, 1 alive; 22 fathoms, 1 dead. Several alive and dead in deep water *(J. C. Verco).* Pl. ii., fig. 6.

In living specimens which measure 12 mm. from the end of the spire to the end of the varix anteriorly whence the anterior tube springs, this is 6 mm. in length, and the posterior tube 9 mm. I have an individual which, including the whole length of the shell and anterior tube, would total 25 mm. Crosse's specimen was 14 mm. total length.

Genus Trophon.

1. T. Goldsteini, *Ten.-Woods.*

Ref.—Proc. Roy. Soc., Tasmania, 1875, p. 136.

Type, Long Bay, Tasmania.

Several South Australian specimens compared with individuals from Tasmania, kindly lent by Miss Lodder, prove to be identical. Some, however, almost constitute a variety, being smaller, and with far less prominent spiral liræ. The shell in life is composed of two distinct layers, an inner enamel-like foundation and an outer sordid white, loose textured, soft chalk-like coating. In perfect specimens this is smooth, but when very slightly worn it shows numerous spiral and longitudinal fibres or incisions. In beach-rolled specimens this is nearly or entirely removed, leaving only the hard shining enamel-like basis, which shows numerous spiral threadlets besides the few sub-raised spiral liræ.

Hab.—Middleton and Rivoli Bay *(D. J. Adcock),* Streaky Bay, Pondolowie Bay *(J. C. Verco).* Dredged Spencer Gulf, 9 fathoms, 1; depth probably 15 fathoms, 4 alive, 1 dead; 10 fathoms, 1 dead; Backstairs Passage, 22 fathoms, 1 dead; Investigators Straits, 20 fathoms, 1 dead (*J. C. Verco*).

2. T. angustus, *Verco.*

Ref.—*Antea*, p. 86.

Hab.—St. Vincent Gulf; dredged deep water, 2 alive, 1 dead (*J. C. Verco*).

3. T. Paivæ, *Crosse.*

Ref.—Jour. de Conch., Third Series, vol., XII., 1864, p. 278, pl. xi., fig. 7.

Type specimen collected at low tide under stones on Yorke's Peninsula, S.A.

Tryon classes it as a *Urosalpinx*, and regards *Fusus Hanleyi*, Angas, as an elate form (Man. of Conch., vol. II., p. 155). But it is not a *Urosalpinx*, and *Fusus Hanleyi*, Angas, is a different shell altogether. He says also "it is not readily distinguished from *U. Floridana*, Conrad. Von Martens considers *Fusus corticatus*, Hutton, a synonym of *U. Paivæ*," *loc. cit.*

Hab.—Dredged alive and dead, deep water St. Vincent Gulf (*J. C. Verco*), Encounter Bay (*D. J. Adcock*).

4. T. recurvus, *Koch* (Fusus).

Ref.—Abbild. und Beschreib., Conch. Philippi, vol. II., p. 119, tab. 3, fig. 6.

This shell was separated as a species distinct from *T. Paivæ*, by Mr. W. T. Bednall, who was proposing to describe it as new, when its identity with the *Fusus recurvus* of Koch, of unknown habitat, was recognised.

Hab.—St. Vincent Gulf, Salt Creek (*W. T. Bednall*), Semaphore, alive (*D. J. Adcock*).

5. T. Assisi, *Ten.-Woods.*

Ref.—Proc. Roy. Soc. Tasmania, 1876, p. 132.

Type specimens, N. Coast, Tasmania (*W. F. Petterd*).

Tryon classes it as a *Urosalpinx*, and "doubts its distinctness from *U. Paivæ*, Crosse. It is probably a young shell," Man. of Conch., vol. II., p. 155.

But it is not a *Urosalpinx*, for its operculum is ovate, with an apical nucleus. It is quite distinct from *T. Paivæ*; as T. Woods says, "it is easily distinguished by its long canal, and peculiar lamellose striations" (longitudinal, *J. C. V.*).

It is not a young shell. Counting the number of its whorls, it is often older than *T. Paivæ*, and when full grown retains the same characters.

It has been placed in Mr. Adcock's list as a *Peristernia*; but the absence of columellar plications, and the muricoid, and not fasciolarioid radula, which is figured on pl. iii., fig. 2, remove it from that genus.

Dredged. Yankalilla Bay, St. Vincent Gulf, 15 fathoms, in ooze, 2 alive, 8 dead; Spencer Gulf, 13 fathoms, 2 dead; 15 fathoms, 2 dead; Investigators Straits, 15 fathoms, 3 alive, 3 dead; 17 fathoms, 9 alive, 68 dead (*J. C. Verco*).

6. T. Petterdi, *Brazier.*

Ref.—Jour. Conchyl., third series, vol. X., 1870, p. 303, and vol. XI., 1871, p. 324, t. 12, fig. 2.

Syn.—*T. clathratus*, Woods, according to Von. Martens (Zool. Rec., 152, 1875).

Murex scalarinus, A. Adams, is identical or allied, according to Tryon.

Hab.—Middleton Beach, very many *(D. J. Adcock)*. Aldinga Beach (*J. C. Verco*). Dredged Spencer Gulf, deep water, many alive and dead (*J. C. Verco*). The Levens Beach, under stones, Tasmania (*Miss Lodder*).

My dredged specimens are identical with some forwarded by Miss M. Lodder from Tasmania. Mr. Adcock's, from Middleton, appear to be the same species, but have a blunter apex, and a shorter snout, probably because beach-worn; they are also slightly larger and stouter, perhaps because from a more exposed locality, and more manifest color bands. These bands are evidently variable in number; some have three, one just below the suture, a second in the centre of the last whorl, a third below the periphery, and winding round the base. Some have only the lower two, others only the lowest, and some are destitute of bands.

7. T. Brazieri, *Ten.-Woods.*

Ref.—Proc. Roy. Soc. Tasmania, 1875, p. 136.

Type specimen, Tasmania.

Hab.—MacDonnell Bay *(D. J. Adcock)*; Victoria.

8. T. Flindersi, *Ads. & Ang. (Purpura).*

Ref.—Proc. Zool. Soc., 1863, p. 421.

Type from Yorke Peninsula, S.A.

The operculum is distinctly muricoid, and not purpuroid; and Tryon is right in transferring it to *Trophon* from *Purpura*. Woods suggests that *T. Flindersi*, *T. littorinoides* (Ten.-Woods), and *T. propinqua* (Ten.-Woods) may prove varieties only of the same species. The Malacological Section of the Roy. Soc. of S.A. are of opinion that the latter two are synonymous with *Ricinula Adelaidensis;* but *T. Flindersi*, is a distinct species.

Hab.—Along the whole coast of South Australia, on rocks from high to low tides

Dentition, plate iii., fig. 1.

9. T. levis, *Verco.*

Ref.—*Antea*, p. 87.

Hab.—Backstairs Passage, St. Vincent Gulf, South Australia, 22 fathoms, dredged alive, one example (*J. C. Verco*).

GENUS PURPURA.

1. P. succincta, *Martyn.*

Ref.—Univ. Conch., II., pl. 45.

Tryon gives South Australia as the metropolis of this species (Man. of Conch., vol. II., p. 170), but the form figured by Martyn, having strong revolving ribs with excavated sides, is very rare on the South Australian coast. It would appear, however, that *P. textiliosa*, Lam. (Edit. Desh. 2, vol. X., p. 77), is only a variety of *P. succincta*, and this is a very common shell here. Tryon also affirms the identity of *P. ægrota*, Reeve (Conch. Icon. 1846, sp. 42), with *P. mancinella*, Linn. (Syst. Nat. Edit. 12, 1,219), both of which are tuberculate forms. From a large number of specimens we have been able to obtain complete series of gradations between *P. succincta* and *P. textiliosa*, and between *P. textiliosa* and *P. ægrota*, proving them all to be but variations of a common species. As *P. succincta*, Martyn, has priority of description, this is chosen as the name of the species, and the rest are regarded as varieties. This is satisfactory, too, inasmuch as a form closely resembling the typical shell is the first to appear palæontologically in our Miocene strata (*teste*, *Tate*).

2. P. striata, *Martyn* (Buccinum striatum).

Ref.—Univ. Conch., t. 7 ; is also given by Tryon as a synonym for *P. succincta.*

It is unknown to local collectors, but included here on the authority of Brazier (P.L.S., N.S.W., vol. V., p. 481, 1881).

3. P. Baileyana. *Ten.-Woods.*

Ref.—Proc. Roy. Soc., Victoria, 1880, p. 80.

Very rare in South Australia.

Hab.—Living on rocks, Guichen Bay (*Zietz*).

GENUS RICINULA.

1. R. Adelaidensis, *Crosse.*

Ref.—Jour. de Conch., 1865, vol. XIII., p. 50, t. 2, fig. 1.

Specimens of type and two varieties, *R. procerula* and *R. aurea*, from Port Adelaide and Gulf St. Vincent.

The Malacological Section are of opinion that *Trophon littorinoides*, Ten.-Woods (Proc. Roy. Soc., Tasmania, 1875, p. 135), and *Trophon propinqua*, Ten.-Woods (Proc. Roy. Soc.,

Tasmania, 1876, p. 136), are identical, as suggested by Woods himself, and are synonyms of *R. Adelaidensis;* but quite distinct from *Trophon Flindersi*, of which Woods thought they might be varieties.

Hab.—Streaky Bay to Encounter Bay, on rocks below high-tide mark.

2. R. reticulata, *Quoy and Gaimard.*

Ref.—Voy. de l'Ast, II., 566, t. 38, fig. 17, 18.

Syn.—*Purpura humilis*, Crosse and Fischer (Jour. de Conch., XIII., 1865, p. 51, t. 2, fig. 2); the type from St. Vincent Gulf.

Tryon regards these as young shells of the beaded form of *R. undata*, Chem. (Man. of Conch., vol. II., p. 189). This we are unable to determine.

Dimensions.—Crosse gives the dimensions as 12 mm. by 6 mm., but it often attains the magnitude of 18 mm. by 10 mm. Its station is quite different from that of *R. Adelaidensis*, which is a littoral shell; for it is dredged alive at 13 fathoms, 1; at 18 fathoms, 3; while larger specimens have been taken dead at 15 and 20 fathoms.

Hab.—Streaky Bay to Encounter Bay. Tasmania.

Genus Adamsia.

A. Adelaidæ, *Adams and Angas.*

Ref.—Proc. Zool. Soc., 1863, p. 421, t. 37, fig. 2.

Type from Port Adelaide, S.A.

Tryon, in Man. of Conch., vol. II., p. 156, gives it as a variety of *Urosalpinx tritoniformis*, Blainville, which he says is identical with *Adamsia typica* of H. and A. Adams, and that *Purpura neglecta* of Adams and Angas is synonymous with *A. Adelaidæ*. Specimens of the first from N.W. Tasmania (*W. T. Bednall*) are, however, easily separable by their more elate form and much more numerous spiral liræ and scarcely visible incremental striæ. *P. neglecta* from Port Jackson (*W. T. Bednall*) is also distinguishable as a smaller shell, more elate, and angulate and tuberculo-plicate, and has a closer affinity with *Ricinula reticulata*, Q. and G.

FAMILY TRITONIDÆ.

Genus Triton.

1. T. nodiferus, *Lam.*

Ref.—Edit. Desh., IX., 624.

Syn.—*T. Sauliæ*, Reeve, Proc. Zool. Soc., 1844, 112; Conch. Icon., 1844, fig. 17; and *T. australis*, Lam., Edit. Desh., IX., 625 (see Tryon Man., vol. III., p. 10).

One specimen in Adelaide Museum, found on Thistle Island, Spencer Gulf, by Mr. Zietz.

2. T. subdistortus, *Lam.*

Ref.—Edit. Desh., IX., 638.

Hab.—St. Vincent and Spencer Gulfs; Encounter and Lacepede Bays (*D. J. Adcock*); Tasmania; Victoria.

Dredged alive, 10 fathoms, 4; 11 fathoms, 2; 12 fathoms, 1; 15 fathoms, 1, with many round yellow eggs attached separately to inside of deep valve of Pecten fumatus; 17 fathoms, 5; 22 fathoms, 1 (*J. C. Verco*).

3. T. Bassi, *Angas.*

Ref.—Zool. Proc., 1869, 45, t. 21, fig. 2.

Syn.—*T. fraterculus*, Dunker (Mal. Blatt., XVIII., 1871, 106).

Tryon, in his Man., vol. III., p. 11, says it is probably synonymous with *T. subdistortus*, but he could not have had the two shells for comparison; they are quite distinct.

Type from Corner Inlet, Bass Straits (*Brazier*).

Hab.—St. Vincent Gulf, Backstairs Passage, Investigators Straits (*J. C. Verco*), Encounter and Lacepede Bays (*D. J. Adcock*).

Dredged alive, 14 fathoms, 1 mature and 6 minute fry inside the valve of a Cardium multicostatum; 17 fathoms, 4 and 1 immature; 19 fathoms, 1 in dead shell and coral (*J. C. Verco*).

4. T. mimeticus, *Tate (Sipho?).*

Ref.—Trans. Roy. Soc. S.A., 1893, part I., p. 189, pl. i., fig. 10; also *Verco, ante*, p. 88, pl. ii., figs. 4, 4*a*.

Tapley's Shoal, 12-16 fathoms, 1 dead (*Matthews*); Investigator's Straits, 15 fathoms, 1 dead; 20 fathoms, 1 dead (*Verco*).

5. T. Spengleri, *Lam.*

Ref.—Edit. Desh., IX., p. 627.

Hab.—Middleton (*D. J. Adcock*), Port Lincoln (*Perks*), Cable Cove, Cape Spencer (*J. Matthews*).

6. T. Waterhousei, *Adams & Angas.*

Ref.—Zool. Proc., 1864, p. 35.

Type from Port Lincoln.

Hab.—From Streaky Bay to Encounter Bay (*Verco*), Port Jackson.

Dredged alive, 14 fathoms, 1; 16 fathoms, 1; 20 fathoms, 2; 22 fathoms, 1 (*Verco*).

7. T. Barthelemyi, *Bernardi.*

Ref.—Jour. de Conch., 1857, p. 55. *Angas*, Proc. Zool. Soc., 1865, p. 161.

"Evidently very closely allied to *T. Spengleri*, of which it will very probably prove to be an overgrown form" (Tryon Man., vol. III., p. 17).

This shell has not been taken or recognised by local collectors.

Angas, *loc. cit.*, gives its station "amongst rocks at low tides.

"*Hab.*—Cape Northumberland; Gippsland, Victoria."

He distinguishes it from *T. Spengleri*.

8. T. exaratus, *Reeve.*

Ref.—Proc. Zool. Soc., 1844, p. 116; Conch. Icon., 1844, fig. 50.

Tryon (Man., vol. III., p. 23) suspects this to be identical with *T. gibbosus*, Brod.

Type from N. coast of Australia.

Hab.—Middleton and Kingston Beaches (*Adcock*).

9. T. Quoyi, *Reeve.*

Ref.—Conch. Icon., 1844, fig. 93.

Syn.—"*T. viperinum* of Kiener, not Lamark—the latter being a distinct fossil form" (Tryon, Man., vol. III., p. 24).

Hab.—Along whole coast-line of South Australia. Tasmania; Victoria.

Dredged alive at all depths from 5 to 30 fathoms, many (*Verco*).

10. T. verrucosus, *Reeve.*

Ref.—Proc. Zool. Soc., 1844, p. 118; Conch. Icon., 1844, fig. 71.

Hab.—Streaky Bay, Spencer Gulf (*Verco*), Aldinga and McDonnell Bay (*D. J. Adcock*).

11. T. eburneus, *Reeve.*

Ref.—Proc. Zool. Soc., 1844, p. 118; Conch. Icon., 1844, fig. 69.

Type from Isle of Ticao, Philippines.

Hab.—Wallaroo Bay (*Maughan*), Corny Point, Spencer Gulf (*Perks*), Pondolowie and McDonnell Bays (*Verco*). Dredged one recent in 22 fathoms, Backstairs Passage (*Verco*).

12. Triton (Epidromus) Bednalli, *Brazier.*

Ref.—Proc. Linn. Soc. of N.S.W., 1875, p. 6.

Type from Guichen Bay, S.A. (*Bednall*).

It may be dark mahogany-brown, or quite white, or with narrow brown bands, or with two rows of small square spots on each spire-whorl, and four on the body-whorl.

Hab.—Corny Point, Spencer Gulf, very fine (*Perks*); Middleton (*D. J. Adcock*), Victoria; St. Vincent and Spencer Gulfs, dredged 16, 20, and 22 fathoms, 1 dead (*Verco*).

Genus Ranella.

1. R. leucostoma, *Lamarck.*

Ref.—Edit. Desh., vol. IX., p. 542; Reeve, Conch. Icon., fig. 4; Coq. Viv. Mon., p. 29, pl. ix., fig. 1.

Hab.—Middleton (*D. J. Adcock*), Yorke Peninsula, St. Vincent Gulf (*Matthews*); Tasmania; New Zealand.

2. R. argus, *Gmelin.*

Ref.—Dieff., N.Z., p. 229; Reeve, Conch. Icon., fig. 13; Chenu, fig. 713.

Syn.—*R. ranelliformis*, King, Zool. Jour., vol. V., p. 347; *R. vexillum*, Sow., Zool. Proc., 1841, p. 51; *R. proditor*, Frauenfeld, Verh. Zool. Bot. Gesell, Wien, XV., 1865, 894; Velain, Archives Zool. Exp., VI., 100, t. 2, fig. 5; *R. tumida*, Dunker, Zool. Proc., 1862, 239.

Type form from Cape of Good Hope.

Ref.—One small example cast up Port Elliot (*Miss E. Stow*); New Zealand.

Genus Fusus.

1. F. australis, *Quoy.*

Ref.—Voy. de l'Ast., vol. II., p. 495, t. 24, figs. 9-14 (pl. xxxiv., according to Kiener in Coq. Viv. Mon. p. 25, pl. xii., fig. 1).

Syn.—*F. crebriliratus*, Rve., Conch. Icon., 1847, fig. 20; *F. marmoratus*, Phil., Abbild. & Besch., 1846, vol. II., p. 120, t. iii., fig. 7; *F. rudicostatus*, Sby., Thes. Conch., 1880, sp. 30, fig. 19; *F. lævigatus*, Sby., Thes. Conch., 1880, sp. 30, fig. 157; *F. nodocinctus*, A. Ads., Zool. Proc., 1855, p. 222; *F. aureus*, Rve., Conch. Icon., 1847, fig. 17; *F. caudatus*, Quoy, Voy. de l'Ast., vol. II., p. 503, t. 34, fig. 20, 21.

Its dentition is figured by me on pl. iii., fig. 4, and shows a small rachidian tooth, with three short denticles, and a long, curved, ten-tooth lateral.

Hab—Spencer and St. Vincent Gulfs, Encounter Bay.

Dredged alive at all depths up to 23 fathoms (*Verco*).

2. F. pyrulatus, *Reeve.*

Ref.—Conch. Icon., 1847, t. 13, fig. 50*a*-50*b*.

"The type is from Tasmania, but it also occurs in Port Phillip Bay, and, according to Angas, in Spencer Gulf" (Tate, Trans. Roy. Soc. S.A., vol. XIV., p. 257).

Dredged alive in Hardwicke Bay, Spencer Gulf, many; Backstairs Passage, 15 fathoms, 1 small; 17 fathoms, 1 small. Investigator's Straits, 15 fathoms, 1 recent (*Verco*).

This shell, originally described by Reeve as a *Fusus*, and so

placed by Tryon (Man., vol. III., p. 60)—he had not seen the species—was named by Prof. Tate, *loc. cit.*, *Austrofusus pyrulatus*. A drawing of its dentition, given on pl. iii., fig. 5, shows a three-denticled rachidian and curved, saw-like laterals, and definitely withdraws it from *Siphonalia*, and makes it congeneric with *Fusus australis*.

3. F. ustulatus, *Reeve.*

Ref.—Conch. Icon., 1848, fig. 66.

This species was also classed by Prof. Tate, *loc. cit.*, as *Austrofusus;* but Tryon regards it as a *Fusus*. Although I have not yet been able to determine its dentition, yet from its conchological characters, there is little doubt it will prove to be a *Fusus*. Tate also makes it a synonym of *F. sulcatus*, Lam. (An. s, Vert., 1822, vol. VII., p. 125). Tryon, on the other hand, gives *F. sulcatus* of Lam., as a *Siphonalia*, and *F. ustulatus* of Reeve as a *Fusus*. There is little question they are distinct species. Although Tryon gives South Australia as the habitat of *F. sulcatus*, Lam., yet Kiener, in Coq. Viv., when describing and figuring the species from the Lamarckian Collection, says the locality is unknown. I am not aware on what authority Tryon gives South Australia. The excellent plate in Coq. Viv., p. 26, pl. xiii., fig. 1, is that of quite a different shell from our *F. ustulatus*. The former is thin, very ventricose, and has marked, slightly wavy, transverse, dark-chocolate-brown spiral lines; whereas the latter is solid, by no means ventricose, much more attenuated in the spire, and ornamented only with a little scorching on the longitudinal costæ. Chenu's figure of *F. sulcatus* (Manuel de Conchyliologie, p. 140) is evidently not drawn from Lamarck's shell, and is as evidently *F. ustulatus;* here is the explanation of Tate's synonymy.

Hab.—No locality was known to Reeve, but Angas recorded it from St. Vincent Gulf. I have it from three widely separated beaches in this Gulf, and dredged in life, but small, at 19-24 fathoms. Encounter and Lacepede Bays (*D. J. Adcock*).

4. F. Dunkeri, *Jonas.*

Ref.—Malak. Beitrag, 1844, p. 129; Abbild, &c., Phil., 1844, vol. II., p. 191, *t.* 4, fig. 4.

Tryon says (Man. of Conch., vol. III., p. 60) "this is evidently a very much worn specimen, and perhaps not adult; the locality also has not been confirmed by subsequent collectors," *i.e.*, the western coast of New Holland. I have a specimen from Eyre's Sand Patch, which is on the southern coast of Western Australia. He further remarks, "Dr. Philippi considered *F. Taylorianus*, Rve., a synonym, but I do not think the condition of *F. Dunkeri* justifies a positive conclusion. If the two species be merged, the

adopted name will be *Dunkeri*, which has decided priority of publication." Also "*F. Taylorianus*, Rve., appears to be a worn immature state of *F. cinereus*, Rve.," *loc. cit.* The worn state of Jonas's specimen is not so evident to me. It is certainly the same shell as *Siphonalia fuscozonata*, Angas (Proc. Zool. Soc., 1865, p. 56), which from Jonas's priority of definition becomes a synonym. It is not a *Siphonalia*, but a *Fusus*, as is plain from its dentition given in pl. iii., fig. 6. In Mr. Adcock's list it is classed as a *Peristernia*, but it has no trace of columellar folds.

Hab.—St. Vincent and Spencer Gulfs, Encounter Bay.

Dredged alive at all depths from 9 to 22 fathoms (*Verco*).

5. F. Lincolnensis, *Crosse.*

Ref.—Jour. de Conch., XIII., 53, t. 2, fig. 4, 1865.

Type from Port Lincoln, S.A.

Tryon says (Man. of Conch., vol. III., p. 66), "The coloration and very short canal remove this species from *Fusus*, yet I do not know where to locate it. Resembles a *Muricidea*." Its dentition I have shown on pl. iii., fig. 7. There is a rachidian tooth with three small cusps, and long curved saw-like laterals. The prongs of these are very variable in size, not only on any particular lateral, but even corresponding prongs on any pair of laterals, or on consecutive laterals. The radula disposes at once of any suggestion to place it among the *Muricidæ* as a *Muricidea* or *Ocinebra*, and classes it with the *Fusidæ;* while the absence of columellar folds decides its position in the genus *Fusus*. However, unlike ordinary species of the genus, it is left there by a process of exclusion.

Hab.—Spencer Gulf, St. Vincent Gulf, Encounter Bay.

Dredged alive, 10 fathoms, 1; 16 fathoms, 1; 20 fathoms, 1; 22 fathoms, 1; and dead at all depths from 9 to 22 fathoms, many (*Verco*). Under stones at low water, Port Lincoln (*Tate*).

Fusus Novæ Hollandiæ, Rve., and *Fusus Hanleyi*, Angas have not been collected in South Australian waters.

Genus Fasciolaria.

1. F. fusiformis, *Valenciennes.*

Ref.—Kiener, Coq. Viv. Mon., p. 13, t. 4, fig. 2.

The habitat is given there as "The shores of New Holland," with the added note, "A species which still appears rare in collections. We do not know the locality. The Museum (*i.e.*, the Paris Natural History Museum) has two individuals." The shell which has hitherto been considered as *F. fusiformis* among local collectors is only a comparatively smooth variety of *F. coronata*. The true species is rare here, and is represented by

a specimen obtained by Mr. Adcock from Macdonnell Bay, and by two received by me from the same locality. It is a much smaller shell, 2 inches 3 lines, narrower, more regularly and abundantly spirally sulcated, and with well-marked numerous spiral liræ in the throat. Tryon doubts whether it is more than an extreme form of *F. filamentosa*, Lam. (Man., vol. III., p. 76).

2. F. coronata, *Lam.*

Ref.—Edit. 2, vol. IX., 435 ; Reeve, Mon., t. 6.

Type specimens from King and Kangaroo Islands.

Figured and described in Coq. Viv., p. 9, pl. ix., fig. 1, "A species rather common."

This is one of the most common of our Gasteropods, and one of the most variable. Some large specimens may be markedly angulated and coronated throughout all their whorls. Others may lose both angles and tubercles as early as the fourth whorl. These constitute the variety which has usually been regarded as *F. fusiformis*, but in all other respects they correspond with *F. coronata*. Others, after continuing in this form for one or two whorls, again assume the typical shape, and so demonstrate the freedom from angle and tubercles to be only a partial, and not even an individual variation.

Hab.—Throughout whole South Australian coast-line, at low tides attached to rocks.

Dredged alive, not common, up to 22 fathoms (*Verco*). Radula, pl. iii., fig. 8.

Genus Latirus.

1. L. aurantiacus, *Verco.*

Ref.—*Antea*, p. 79.

Unique. Dredged alive, Backstairs Passage, 18½ fathoms (*Verco*).

2. L. Pulleinei, *Verco.*

Ref.—*Antea*, p. 80.

Type from Eyre's Sand Patch, W. Australia.

Hab.—Largs Bay, St. Vincent Gulf (*D. J. Adcock*) ; sub-fossil in dredged silt, Port Adelaide (*Perks*).

Genus Latirofusus.

1. L. nigrofuscus, *Tate.*

Ref.—Proc. Roy. Soc. S.A., vol. XIV., part II., p. 258, pl. xi., fig. 3.

Dredged alive, St. Vincent Gulf, 3-4 fathoms (*Matthews*) ; ? depth (*Verco*) ; Spencer Gulf, 13 fathoms, 1 (*Verco*) ; shell sand, Aldinga Bay (*Kimber*) ; Encounter Bay (*Adcock*).

Correlation of the Marine Tertiaries of Australia.

By Professor R. Tate and J. Dennant, F.G.S., Corr. Memb.

PART II., VICTORIA *(continued)*.

Special Notes on the Eocene Beds at Cape Otway and River Aire, with General Remarks.

[Read June 4, 1895.]

Introduction.

In 1864 the coast-line in the neighbourhood of Cape Otway was surveyed and reported upon by Messrs. Wilkinson and Daintree, of the Geological Survey of Victoria. Collections of fossils were made by them, but with the exception of the corals, have been apparently laid aside and forgotten. Their report is out of print, and for the preservation of portions of its contents, as well as for the drawings of coast sections accompanying it, we are indebted to Professor M. Duncan, who made copious extracts from it when describing the corals in the Geological Society's Journal.* A second survey of the coast was made by Mr. Krause in 1873,† but as he was principally engaged in searching for outcrops of coal, the conclusions of his predecessors concerning the geological details of the coast-line seem to have been accepted. An elaborate plan of the coast was issued by the Mining Department as the result of this survey, giving topographical as well as geological information.‡ Notwithstanding some errors in the Aire River portion of the district, we found the sheets useful as a topographical guide, but, as we shall show in the sequel, grave blunders appear in the mapping of the tertiary outcrops from the Aire River to Castle Cove. We do not allude to the mistake almost universal with the earlier geologists of Victoria in regarding undoubted Eocene strata as Miocene. This may be expected, and the necessary correction is now almost unconsciously supplied, but in the case before us an area some miles in extent is colored Miocene (Eocene) on the map where certainly the prevailing, if not the only outcropping, rocks are the ordinary Post-Pliocene, or recent dune limestones, so common on our coasts. As is well known, they are æolian rocks. In the original

---

* Q. J. G. S., vol. XXVI., 1870.
† Progress Report Geol. Sur. of Victoria, No. 1, 1874.
‡ Geol. Sketch Map of the Cape Otway District, Krausé, 1874.

Memoir by Mr. Wilkinson (as quoted by Duncan) the reference to these rocks is not very clear, though some portions at least seem to have been recognised as younger than Miocene, and are called "more recent Tertiary sandstone." So far as the section given affords a clue, the dune limestone, with its characteristic variation of dip, is apparently indicated. We shall notice this section at greater length presently in the special description of the Aire River rocks.

Cape Otway is 39 miles from Forrest, the nearest railway station, and only 14 miles from Krambruk (Apollo Bay), the terminus of a coach-line; but, though in reality not more than a day's journey from Melbourne, the nature of the country renders travelling difficult, and it is seldom visited, except by a few adventurous tourists. At the Aire River, five miles west of Cape Otway, our guide assured us that probably no one had been on the beach for three years prior to our visit. From Krambruk travelling is either on foot or on horseback, and if a stay at the Cape is intended it is necessary to take materials for camping, the proverbial hospitality of Western Victoria being there conspicuous by its absence. At the Aire River we were most hospitably entertained by Mr. Robinson, the genial proprietor of the Aire Cattle Station.

Cape Otway.

Although called by the above name, the section is really about one and a half miles west of the Cape and close to Point Flinders. The fossils occur in great abundance on the surface of mound-like masses of slate-colored stiff clay which extend from sea-level up to a height of about 40 feet. The chief shells are species of Turritella and Pleurotoma, the latter being especially characteristic of the bed. As the list appended shows, numerous other species occur, but relatively to those named they are individually scarce, many species in our collections being represented by one or two examples only. It is useless to dig for fossils, as just below the surface the clay appears quite barren, though of course the shells are there, but undistinguishable until the clay is washed away from them. The fossiliferous patch is very limited in extent, but as the tops of isolated mounds crop out from under the sand for a few chains to the west, it is probable that the clay underlies for a considerable distance.

To the east mesozoic rocks rise on the cliffs, and the fossiliferous clay disappears. Resting upon the tertiaries, or, when they are wanting, directly upon the mesozoic strata, is a layer of dune limestone of variable thickness, and again upon this the ordinary sand dunes of the coast.

At Point Flinders itself small streams of clear sparkling water fall over the face of the rock. Their origin is interesting, as

at the general level of the country on the top of the cliff there is no sign of a stream. The water, in fact, issues just under the dune limestone, which is a porous rock, and then flows over the dense secondary strata. It flows freely all the year round, and is probably derived from some of the inland water courses, which are numerous enough in the forest country a short distance from the coast. Even the clay of the tertiary mounds is traversed by small runlets of water having the same origin. It was an unusual luxury for us as fossil collectors in the hottest time of the year to have an abundant supply of cold water close at hand. Were it more accessible, this pretty spot would no doubt prove very tempting, being the very model of a picnic resort, especially to those of a geological turn of mind.

In addition to the fossils gathered personally this and last year, we have had access, through the kindness of Mr. Crouch, to a collection made by him while residing at Cape Otway.

The total of determinable species of Mollusca recorded in the appended list is 123; of these 38, or 30 per centum, are, as far as known, restricted to the locality; whilst the occurrence of three species of *Borsonia*, having the whole aspect of *Surcula*, two of which are among the commonest species present, impart a local peculiarity. Moreover, two genera, *Atlanta* and *Woodia*, are added to our Eocene fauna, and are therefore peculiar to the Cape Otway section. The Aldinga, Spring Creek, and Muddy Creek faunas are represented respectively by 40, 41, and 44 species. The most noteworthy fact is the comparatively large proportion of Aldingian species which have hitherto been largely unrecognised among the species of the other chief fossiliferous sections in Australia. Thus of the 40 Aldinga-species present at Cape Otway 18 are restricted to these two sets of beds (in this connection one coral may be added), whilst five of the species indicated are common also to the Spring Creek fauna.

The Aldinga-facies is further intensified by the occurrence of *Plesiotriton*, *Conorbis*, *Mesalia*, and *Triploca*, hitherto restricted. The two former genera are represented by distinct species, and the two latter each by a species in common.

By contrast the number of species in common with the neighbouring section at Gellibrand is 30, which are extralimital. Hence the most reasonable explanation to reconcile these discordant facts of distribution is that the Gellibrand and Cape Otway sections belong to distinct horizons. But before this important question can be adequately discussed a review of the Aldinga beds and those at Table Cape in Tasmania is essential, and for the present we are reluctantly compelled to postpone it.

LIST OF CAPE OTWAY FOSSILS.

[Index numbers to localities:—1, Aldinga; 2, Spring Creek; 3, Gellibrand; 4, Muddy Creek; 5, Mornington; 6, Table Cape].

GASTROPODA.

Murex (Pteronotus) calvus, *Tate*	1	.	.	.	.	.	.	
" " bifrons, *Tate*	1	.	.	.	.	.	.	
" (Chicoreus) tessellaris, *Tate, m.s.*	.	.	.	.	.	.	.	
" (Ocinebra) prionotus, *Tate*	1	.	.	.	.	.	.	
" (Muricidea) hypsellus, *Tate*	1	.	.	.	.	.	.	
Trophon cristatus, *Tate, m.s.*	.	.	.	.	.	.	.	
" cretaceus, *Tate, m.s.*	.	.	.	4	.	.	.	
Triton annectans, *Tate*, var.	.	.	3	4	.	.	.	
" cribrosus, *Tate*, var.	1	.	.	.	.	.	.	
Plesiotriton Dennanti, *Tate, m.s.*	.	.	.	.	.	.	.	
Fusus acanthostephes, *Tate*, var.	.	.	3	4	5	.	.	
" dictyotis, *Tate*	.	.	3	4	5	.	.	
Clavilithes incompositus, *Tate*	1	.	.	.	.	.	.	
" bulbodes, *Tate*	.	.	.	4	5	.	.	
" coronatus, *Tate, m.s.*	.	.	.	.	.	.	.	
Latirofusus cribrosus, *Tate, m.s.*	.	.	.	.	.	.	.	
" sparsicostatus, *Tate, m.s.*	.	.	.	.	.	.	.	
Sipho, n. sp.	.	.	.	.	.	.	.	
Tritonidea interlineata, *Tate, m.s.*	.	.	.	.	.	.	.	
Voluta anticingulata, *McCoy*	.	2	.	.	.	6		
" cribrosa, *Tate*	1	.	.	.	.	.	.	
" McCoyii, *T. Woods*, var.	.	.	.	4	5	6		
" pagodoides, *Tate*	1	2	.	.	.	.	.	
Mitra (Strigatella) Otwayensis, *Tate, m.s.*	.	.	.	.	.	.	.	
" " n. sp.	.	.	.	.	.	.	.	
" (Fusimitra) climakis, *Tate, m.s.*	.	.	.	.	.	.	.	
" (Conomitra) retrofracta, *Tate, m.s.*	.	.	.	.	.	.	.	
Marginella inermis, *Tate*	.	.	.	4	5	.	.	
" inequidens, *Tate, m.s.*	.	.	.	4	5	.	.	
" propinqua, *Tate*	.	2	3	4	5	.	.	
" Wentworthi, *Ten.-Wds.*	1	2	3	4	5	6		
" Woodsii, *Tate*	.	2	3	4	.	.	.	
Columbella Otwayensis, *Tate, m.s.*	.	.	.	.	.	.	.	
Cypræa ovulatella, *Tate*	1	.	.	.	.	.	.	
Trivia avellanoides, *McCoy*	1	2	3	4	5	6		
Erato australis, *Tate*	1	2	3	.	.	.	.	
" minor, *Tate*	.	.	.	4	.	.	.	
" pyrulata, *Tate*	1	.	.	.	.	.	.	
Conorbis quadrisulcatus, *Tate, m.s.*	.	.	.	.	.	.	.	
Borsonia Otwayensis, *Tate, m.s.*	.	.	.	.	.	.	.	
" polycesta, *Tate, m.s.*	.	.	.	.	.	.	.	
" protensa, *Tate, m.s.*	.	.	.	.	.	.	.	
Pleurotoma crenatulifera, *Tate, m.s.*	.	.	.	.	.	.	.	
" (Eopleurotoma) Mulderi, *Tate, m.s.* ...	Belmont							
" (Surcula) Johnstoni, *T. Wds.*, var. ...	.	2	.	.	.	6		
" " terebrellata, *Tate, m.s.* ...	.	2	.	.	.	.	.	
" " claræ, *Ten.-Wds.*	.	.	3	4	.	.	.	
Drillia sandleroides, *Ten.-Wds.*, var.	.	.	.	4	5	6		
Mangilia bidens, *T. Wds.*, var.	.	.	3	4	.	.	.	
Bela pulchra, *Tate*	.	.	.	4	.	6		
" gradata, *Tate, m.s.*	.	.	.	.	.	.	.	
" percorrugata, *Tate, m.s.*	.	.	.	.	.	.		

Bela recticostata, *Tate, m.s.*									
" ephamilla, *Tate, m.s.*									
" micra, *Tate, m.s.*									
Cythara columbellæformis, *Tate, m.s.*						3			
" sublavata, *Tate, m.s.*									
Cancellaria perplexa, *Tate, m.s*									
" cristata, *Tate, m.s.*									
" fontinalis, *Tate, m.s.*					2				
" dyscrita, *Tate, m.s.*					2				
" n. sp.									
Trichotropis subquadrata, *Tate*							4		
Mesalia stylacris, *Tate*				1					
Turritella Aldingæ, *Tate*				1					
Mathilda cryptacris, *Tate, m.s.*									
Natica Wintlei, *T. Wds.*					2				6
Eulima acutispira, *T. Wds.*					2	3	4		
" Danæ, *T. Wds.*				1	2	3	4	5	
" n. sp.									
Colina fenestralis, *Tate*						3	4		
Lovenella trigemmata, *Tate, m.s.*						3	4		
" triserrata, *Tate, m.s.*				1					
" terebræformis, *Tate, m.s.*									
" n. sp.									
" n. sp.									
Cerithium, n. sp.								5	
Potamides, n. sp.									
Torinia Simsoni, *Tate, m.s.*			1	2					6
Turbo supracoronatus, *Tate, m.s.*									
Astralium, n. sp.							4		
Leptothyra, n. sp.							4		
Trochocochlea acutilirata, *Tate, m.s.*									
Calliostoma escharoides, *Tate, m.s.*					2		4		
" n. sp.									
Pleurotomaria, n. sp.									
Tornatella scrobiculata, *T. Wds.*					2		4		
Triploca ligata, *Tate*				1					
Bulimella paucilineata, *Tate, m.s.*					2	3	4	5	
" callosa, *Tate, m.s.*				1					
Atlanta (operculum of)									

SCAPHOPODA.

Entalis Mantelli, *Zittel.*				passim					
" subfissura, *Tate*				passim					
Dentalium aratum, *Tate*				passim					

LAMELLIBRANCHIATA.

Gryphæa tarda, *Hutton*			1	2	3	4			
Pecten Foulcheri, *T. Wds.*				2		4	5		
Amusium Zitteli, *Hutton*			passim						
Dimya dissimilis, *Tate*				2	3	4	5		
Lima Bassi, *T. Wds.*			1	2	3	4	5	6	
Pectunculus laticostatus, *Quoy*				2	3	4	5		
Limopsis insolita, *Sow.*			1	2					
Plagiarca Cainozoica, *Tate*			passim						
Barbatia, n. sp.									
Nucula tumida, *T. Wds.*				2		4		6	
Leda apiculata, *Tate*			1	2		4		6	
" embolos, *Tate, m.s.*				2			5		

Leda leptorhyncha, *Tate*	1	.	.	.	.	.
" obollela, *Tate*	.	2	3	4	5	.
Cardita polynema, *Tate*	.	2	3	.	5	.
" delicatula, *Tate*	.	2	3	4	5	.
Carditella radiata, *Tate*	1	2	.	.	.	.
Woodia globularis, *Tate, m.s.*	.	.	.	.	.	.
Verticordia echinata, *Tate, m.s.*	.	2	.	.	.	.
Trigonia tubulifera, *Tate*	.	2	3	4	5	6
Cytherea tenuis, *Tate*	1	2	.	.	.	.
Chione Cainozoica, *T. Wds.*	1	2	.	4	5	6
" multitæniata, *Tate*	1	2	.	.	.	.
Myodora lamellata, *Tate*	1	.	.	.	.	.
Saxicava arctica, *Linn.*	1	.	.	4	.	.
Corbula pyxidata, *Tate*	1	2	3	.	.	.

PALLIOBRANCHIATA.

Waldheimia insolita, *Tate*	1	2	3	4	5	.
" furcata, *Tate*	1	.	.	.	.	.
Terebratulina triangularis, *Tate*	1	.	.	.	.	.

ECHINODERMATA.

Leiocidaris Australiæ, *Duncan*	passim

ZOANTHARIA.

Flabellum distinctum, *Ed. & H.*	1	2	3	.	.	.
" Victoriæ, *Duncan*	.	2	3	4	5	.
Notocyathus viola, *Dunc.*	.	2	.	4	.	.
Trochocyathus sp.	.	.	.	.	.	.
Deltocyathus Italicus, *Ed. & H.*	.	2	3	.	.	.
" Aldingensis, *Ten.-Wds.*	1	.	.	.	.	.
Conotrochus typus, *Sequenza*	.	.	3	.	5	.
" McCoyii, *Duncan*	.	2	.	.	.	.
Conosmilia anomala, *Dunc.*	.	.	3	4	5	.
" elegans, *Dunc.*	.	.	3	4	.	.
" striata (?), *Dunc.*	.	2	3	4	.	.
" n, sp. ... , ...	.	.	.	.	.	.
Balanophyllia Australiensis, *D.*	.	.	3	4	.	.
" campanulata, *D.*	.	.	3	.	.	.
" cylindrica, *Michelin.*	.	.	.	.	.	.
" Selwyni, *D.*...	.	2	3	.	.	.
" Ulrichi, *D.*	.	.	3	.	.	.
" tubuliformis, *D.*	.	.	.	4	.	.
" n. sp.	.	.	.	.	.	.

POLYZOA.

(Determined by Dr. Macgillivray.)

Phylochella (?) sp.	.	.	.	4	.	.
Cellaria contigua, *McG.*	.	2	3	4	.	.
" cucullata, *McG.*	.	.	.	.	.	.
" Dennanti, *McG.*	.	.	.	.	.	.
Lunulites biformis, *McG.*	.	.	.	.	.	.
Salenaria maculata, *Busk.*	.	.	.	4	5	.
" squamosa, *McG.*	.	.	.	4	5	.
" cupola, *Ten.-Wds.*	.	.	.	4	5	.
Adeona symmetrica, *Waters*	.	2	3	4	5	.
Tessaradoma elevata, *Ten.-Wds.*	1	.	3	4	5	.
Porina gracilis, *M. Edw.*	.	.	3	4	5	.

FORAMINIFERA

(Determined by Mr. W. Howchin, F.G.S., from examples selected and mounted by Mr. E. J. Bradley).

Biloculina ringens, *Lank.*
Miliolina circularis, *Bornem.*
" oblonga, *Montag.*
Cornuspira involvens, *Rss.*
*Sigmoilina tenuis, *Czjzek.*
*Reophax bacillaris, *Brady*
Haplophragmium pseudospirale, *Will.*
Textularia aspera, *Brady*
" sagittula, *Def.*
" sagittula, var. fistulosa, *Brady*
* " globulosa, *Ehr.*
†Spiroplecta annectans, *P. & J.*
Gaudryina pupoides, *d'Orb.*
*Bulimina ovata, *d'Orb.*
" elegantissima
Bolivina limbata, *Brady*
Cassidulina subglobosa, *Brady*
*Lagena acuticosta, *Rss.*
* " castrensis, *Sch.*
* " distoma, *P. & J.*
" globosa, *Montag.*
" gracillima, *Seg.*
* " hexagona, *Will.*
" lævis, *Montag.*
" marginata, *W. & J.*
* " orbignyana, *Seg.*
* " striata, *d'Orb.*
" sulcata, *W. & J.*
Nodosaria communis, *d'Orb.*
" consobrina, *d'Orb.*
* " hispida, *d'Orb.*
" lævigata, *d'Orb.*
* " obliquestriata, *Rss.*
*Nodosaria pyrula, *d'Orb.*
" radicula, *Linné*
" scalaris, *Batsch.*
" soluta, *Rss.*
Vaginulina legumen, *Linné*
*Rhabdogonium tricarinatum, *d'Orb.*
*Marginulina Pecketi, var. spinosa, *Schrodt.*
Cristellaria acutauricularis, *F. & M.*
" cultrata, *Montf.*
" Schlœnbachi, *Rss.*
Polymorphina communis, *d'Orb.*
" elegantissima, *P. & J.*
" gibba, *d'Orb.*
" lactea, *W. & J.*
" oblonga, *d'Orb.*
" problema, *d'Orb.*
*Uvigerina asperula, *Czjzek.*
Globigerina bulloides, *d'Orb.*
Pullenia quinqueloba, *Rss.*
" sphæroides, *d'Orb.*
Spirillina decorata, *Brady*
* " (?) limbata, var. denticulata, *Br.*
Discorbina biconcava, *P. & J.*
" turbo, *d'Orb.*
Truncatulina lobatula, *W. & J.*
Pulvinulina Hauerii, *d'Orb.*
* " Micheliniana, *d'Orb.*
" repanda, *F. & M.*
Nonionina umbilicatula, *Montf.*
Polystomella crispa, *Linn.*
" macella, *F. & M.*

In the above list of 64 species there are 19 species and one genus which have not hitherto been recognised within the Australian area. These additions to our foraminiferal fauna are indicated by an * for the species and † for the genus. The large number of species here indicated new to our Eocene beds (amounting to one-third of the whole) is a remarkable result. This is particularly noteworthy in the *Lagenæ*, for of the 11 species in the list more than half are noted for the first time. The genus *Spiroplecta* has a geological history dating from the Gault, and our species, *S. annectans*, was dredged by the Challenger in Torres Straits. *Reophax bacillaris* has not previously been recognised in a fossil condition, neither has *Spirillina limbata var. denticulata*, which appears to be represented in the material by one immature example. This form was also dredged by the Challenger both in Bass's and Torres Straits. Of the other new forms, *Nodosaria hispida* dates from the Trias, *Textularia globulosa*, *Lagena acuticosta*, and *Pulvinulina Micheliniana* from the Cretaceous, and the remainder have more or less of a Tertiary distribution. The interesting form *Marginulina Pecketi, var. spinosa* was discovered and described by Franz Schrodt, from the Pliocene beds of Garrucha, in the south of Spain (1890).

In addition to the list now published there are one or two forms in this interesting material which are probably undescribed, but are held over for further examination.

Aire River.

The principal object of our visit to the Cape Otway district this year was to observe the leaf-beds and shell-deposits recorded by the Geological Survey near the mouth of the Aire River, the Eocenes at Point Flinders having been examined on a previous occasion. Mr. Wilkinson records a leaf-bed 17 feet thick a mile and a half west of the river-mouth, and below this again a clay bed with fossils similar to those at Cape Otway. Prof. Duncan specially mentions six species of corals obtained from the clay, amongst which are three gathered by us at Point Flinders, the remaining three not appearing in any of our collections from the locality. Moreover, the existence of synclines and anticlines in the strata is indicated in the report, and also in the section accompanying it.

The geological sketch map previously mentioned is not only more definite, but very considerably enlarges the area occupied by the tertiaries in the neighbourhood of the Aire River. According to this map they extend uninterruptedly from the mouth of the river to Castle Cove, a distance of about three miles. No mere fringe on the sea beach is meant, as the coloring shows a width of fully a mile for the greater part of the distance.

To our great disappointment we were unable to find any tertiary outcrop either on the sea beach or on the top of the cliffs adjoining the beach. We traversed the beach from the river to Castle Cove, and found it occupied by rugged dune limestone for the greater part of the distance, not only in fallen fragments, but *in situ*, with the same rock occasionally extending seaward for a short distance. At the western end, in the vicinity of Castle Cove, this was succeeded by mesozoic strata. Most certainly the top of the cliffs should be marked Post-Pliocene (? recent) dune limestone capped by sandhills, but although, as said before, we were quite unable to discover any trace of Mr. Wilkinson's leaf or clay beds on the beach, it is, we admit, just possible that some such rocks may crop out beneath the dune limestone and become visible when the tide is very low. A guide, whom Mr. Robinson obligingly sent with us, professed to be able to find these clay beds, but after spending half the day in searching had to acknowledge himself puzzled, and offered the supposition that they had been either washed away or covered with sand since he last saw them.

From the existence of Eocene strata at Point Flinders, and also on the Ford River, close to the homestead, it is not unlikely that similar strata underlie the dune limestone on this part of

the coast. If so, they can only occur close to or below sea level, and not, as indicated on the sketch map, on the top of the cliffs, which are 200 feet high, and show Post-Pliocene or recent rocks from base to summit.

The only undoubted Tertiary outcrop seen by us at the Aire was that just referred to, which is an Eocene outlier of polyzoal limestone abutting against Mesozoic rock. *Waldheimia Garibaldiana*, *Pecten Foulcheri* and a cast of *Voluta Mortoni* were observed. Other outliers are shown on the map, viz., at Fischer's Point, and on the east side of the Aire, but as our time was limited we did not visit them, and no fossils have been recorded from either.

General.

Since the publication of Part I. of this "Correlation," an important paper on "The Sequence of the Eocene Rocks of Victoria," has been contributed by Messrs. Hall & Pritchard.* At Maude, as is well known, Tertiary deposits occur both above and below a layer of basalt, which has been described by the Survey as a subsequent intercalation, but this reading is disputed in the article referred to. The inferior of the two deposits is next correlated with the Spring Creek Section, which from its slightly lower percentage of recent species they assign to a much lower horizon of the Eocene than Muddy Creek, Schnapper Point, and certain other Tertiary outcrops.

For their calculations upon the Muddy Creek mollusca they rely partly upon a list of species published in 1888, and partly upon the figures given in Part I. of this "Correlation" in 1893, but some extensive researches made personally in January of this year enable us to correct the quoted figures, and supply the latest data. The shells recently gathered are not yet completly sorted, but, so far, the mollusca proper for the lower zone at Muddy Creek show a total of 649 species. Only eight of these, and not ten, as stated in the Maude article, are recorded to have living representatives, so that the percentage of existing species is 1·2, instead of 2, according to Messrs. Hall & Pritchard's calculations. One per cent. of recent species is claimed by the authors named for the Spring Creek fauna, which may be accepted as approximately correct, but it is obviously unwise to attempt a classification of Tertiary strata on a difference of less than a half per cent., or even, indeed, on 1 per cent. of existing forms. Should an alleged living representative be discredited, or a single fresh recent species be recorded, the percentage would be substantially altered. Muddy Creek, with its extremely rich fauna, would not be so much affected, but a moderately prolific bed like

* "The Older Tertiaries of Maude," &c., Proc. Roy. Soc. Vic., 1895.

that at Spring Creek would jump up or down, as the case might be, a half per cent. at once. Indeed, for one or two of the Muddy Creek species referred to, their identification with living forms is not absolutely positive, so that too much stress must not be laid on even this low percentage. Messrs. Hall & Pritchard's calculations for Spring Creek are based upon a total of 293 species of mollusca from the beds. Our list, corrected by supplying a few omissions, and adding the remainder of the Pleurotomidæ, gives 275 species, which is a fairly close agreement.

A sufficient number of species has now been elaborated from Muddy Creek and Spring Creek to allow of a comparison between them on a somewhat different basis, which may prove useful with such closely allied beds. The Miocene deposit resting upon the Eocene at Muddy Creek has, up to the present, yielded 244 species of mollusca, and that at Jemmy's Point about half this number. Now, it is curious to note that of the 275 species on our list for Spring Creek, 16, or 5·8 per cent., pass up into the Miocene, while out of the 649 species in the Muddy Creek Eocene, 30 species pass up, or only 4·6 per cent., which is unfavorable to the inferior horizon claimed for Spring Creek. In fact, the presence of such characteristic Miocene forms at Spring Creek as *Mactra axiniformis*, *Ancillaria orycta*, *Dosinia Johnstoni*, &c., is a distinct factor in the general facies of the fauna, and must be taken into account in estimating its age.

According to the summary at the end of their paper, Messrs. Hall & Pritchard make the Eocene sands of Muddy Creek rest upon the polyzoal rock, and this again upon the Older Volcanic. The Older Volcanic is wanting in South-Western Victoria, at least in the neighbourhood of the Tertiaries, the basal rocks, where visible, being either Mesozoic strata or a still more ancient porphyry, but the polyzoal limestone attains a much greater development there than in the Geelong District. Moreover, that this rock really underlies the Eocene sands may well be doubted; more probably it is coterminous with them. On the Grange Burn it is found at a low level certainly, but a section, seen at our last visit near the Falls in Muddy Creek itself, showed an apparent gradual passage from gastropod beds into typical polyzoal rock. The same is the case at Spring Creek, and presumably also at the North Belmont section, judging from its description in Messrs. Hall & Pritchard's paper.* Possibly, some sections in the Geelong District may show the rock in an inferior position, but this does not appear to be universal, especially in the Western District, where the formation is best studied.

It is notable that in almost every exposure of Eocene strata,

* Compare pages 191 and 194, Older Tertiaries of Maude.

as surely as gastropod beds are found, close at hand appears a polyzoal rock, as if there was some intimate connection between the two. On the whole, the latter is apparently a deeper sea deposit than the former, which can only be formed in shallower water. If this is the true explanation, a simultaneous deposition of the two kinds of strata may have taken place in closely adjoining areas.

In the above remarks, actual equivalence of geological age for the polyzoal rocks of separate localities is not necessarily implied, but see *infra*.

The correctness of our reading of the Spring Creek section, as given in Part I.,* is amply borne out by further observations made within the last few weeks by one of the present writers, in company with Mr. J. Mulder and the Rev. A. Cresswell.

At the south end of the section it will be remembered that the rugged Polyzoal rock passes gradually into slightly softer strata full of Echinoderms, but showing few other fossils, except an occasional bivalve. Similar strata, also containing numerous examples of Echinoderms, overlie the shell beds on the south side of "The Ledge," but owing to the dip and the increased steepness of the cliffs the fossils are there out of reach, and are only known from the fallen blocks lying upon the beach. From them, however, not only Echinoderms, but also mollusca in limited numbers have been gathered.

At a point still more to the south, known as the "Fishermen's Steps," from the fact that footholds have been cut in the Echinoderm rock, the cliffs are less abrupt and can be scaled with ease. Driven by the advancing tide from the usual collecting grounds to this locality, a perpendicular rock from 30 to 40 feet up the cliff was searched for Echinoderms, almost the only fossils visible. Overhead, and resting directly upon a projecting ledge at the top of this rock, a large quantity of broken bivalves showed, looking in the distance like the shells of a raised beach. By a little awkward climbing they were reached, and proved to be derived from an earthy bank overlying the echinoderm rock. Starting from the narrow ledge on the top of this rock, where the broken shells have accumulated, the fossiliferous earths and clays extend up the cliffs, with here and there a narrow band of hard rock alternating with the softer material. A somewhat similar alternation of rocky bands and clays is observable at the north end of the section, near the Bird Rock; the fossils in the clays there are, however, scarcer, and include some species not yet found at the Fishermen's Steps.

---

* Correlation of the Marine Tertiaries of Australia. Roy. Soc. of South Australia, vol. XVII., pp. 206 *et seq.*

Nearly an hour was spent in collecting from the latter locality, and though the fossils are somewhat rotten, and with difficulty extracted whole, they are often entire before removal from the matrix, and are thus presumably *in situ*. Some large, strong shells and, as usual, very small ones came out perfect enough.

The following is a list of the determinable species obtained; those marked with an asterisk have been collected previously in the general section :—

*Voluta anticingulata
*Natica Wintlei
" polita
*Turritella septifraga
* " conspicabilis
Mathilda bicarinata
Odostomia Victoriæ
Eulimella gracillissima
Liotia Roblini
*Tinostoma parvula
*Eumargarita strigata
*Ringicula lactea
Volvulella sp.
*Entalis Mantelli
* " subfissura
*Dentalium bifrons
* " aratum
Spiralis tertiaria
*Dimya dissimilis
*Pecten Foulcheri
* " Murrayana
* " Hochstetteri
* " lucens
*Spondylus gæderopoides
*Nucula tumida
*Leda embolos
* " apiculata
*Limopsis Belcheri
*Pectunculus laticostatus
* " cainozoicus
*Barbatia interclathrata
*Cucullæa Corioensis
*Crassatella Hallii
*Cardita polynema
* " aff. C. solida
*Carditella inornata
*Chione multitæniata
* " Pritchardi
Corbula ephamilla
*Salenaria, two sp.
*Vincularia, sp.
*Flabellum Victoriæ
*Placotrochus deltoideus
Notocyathus sp.
*Deltocyathus Italicus
*Bathyactis discus
*Cornuspira involvens
*Biloculina depressa
*Miliolina seminulum

Out of 39 species of mollusca here recorded eight appear in the section for the first time, which is a rather large percentage of fresh species for an hour's collecting. Some remarks upon this matter will be made later on. Many of the most characteristic Spring Creek shells are, however, represented.

Since the molluscan beds thus *overlie* as well as *underlie* the echinoderm rock the latter cannot be assigned to either a higher or lower horizon, but must be regarded as practically of equivalent geological age, and its different lithological character as well as the greater prevalence of certain species of fossils, together with the scarcity or absence of others, may be due to change in the sediments, and probably also to oscillations of level in the area of deposition during the Eocene period.

The only other point on which any difference of opinion can exist is as to the relationship of the Echinoderm and Polyzoal rocks. Possibly there are some slight lithological differences between them, but, as is well known, variations of this kind are not

to be trusted as a test of geological age. Echinoderms, which are the principal fossils recognisable, have been collected from the Polyzoal rock, chiefly on the north side of Spring Creek, where it is typically developed, and prove to be the same as those from the rock face at Fishermen's Steps. In addition, a few brachiopods, polyzoa, fragments of bivalves, &c., have been extracted from the same rugged rocks, but no species unrepresented in the accompanying strata have so far been noticed. On palæontological grounds, therefore, its separation from the adjoining Echinoderm rock does not seem feasible.

It is well known that the molluscan beds of Spring Creek, Curlewis, Mitchell River, Muddy Creek, &c., though agreeing in broad general characters, exhibit in each case certain faunal peculiarities, and when the polyzoal rocks accompanying them respectively are critically examined and compared, which is only partially done at present, considerable variation in their fossil contents will, no doubt, also be shown. For Muddy Creek and Spring Creek this can be already asserted—in fact, the polyzoal rock of Muddy Creek and the Grange Burn might with almost equal propriety be styled nummulitic limestone, from the abundance of *Nummulites variolaria* contained in it.*

Attention has at various times been drawn to the probability that minor zones exist in the respective Eocene deposits of Victoria. From the various observations recorded, it appears futile to seek them in any supposed undeviating sequence of the molluscan beds and their accompanying polyzoal rocks, the presence of one or the other in particular areas being probably dependent on bathymetrical conditions, but in the shell beds themselves, with their extremely rich fauna, the problem may possibly be attacked with greater chance of success. At Muddy Creek some work has been done in this direction, though, so far, with indefinite results; but from the great height of the exposure at Spring Creek, fully 200 feet, a good opportunity is afforded for comparing the fauna of different levels. Along the whole section fallen blocks from the upper levels strew the beach, and hitherto collectors have mixed indiscriminately the fossils yielded by them with those gathered *in situ* from the lower part of the cliffs, the theory being that the fauna was practically indivisible.

When collecting at the Fishermen's Steps, the most characteristic shell obtained was *Crassatella Hallii*, which is very abundant, though rare at lower levels. Other species, as *Liotia Roblini*, *Corbula ephamilla*, *Natica polita*, &c., have not been previously recorded from the Spring Creek section, and we offer the suggestion that at this level, and above the echinoderm rock,

---

*Trans. Aust. Assoc. Adv. Science, Melbourne Meeting, pp. 442, 443.

a minor zone of the Eocene may possibly be demonstrated—at any rate, the matter is worthy of further research.

At the north end of the section, in the topmost clays, near Bird Rock, Mr. Mulder has pointed out that *Ancillaria hebera* is a very frequent shell, though quite rare in other parts of the beds. Further peculiarities of the fauna have also been traced, which induce him to think that these clays mark a minor zone of deposition.

Appendix.

In No. VIII. of the Progress Reports of the Geological Survey of Victoria issued last year, notes (accompanied by a list of fossils) are contributed by Mr. James Stirling concerning the age of the lower members of the Tertiaries in Victoria, in the course of which some remarks by Professor McCoy, criticising adversely our views on the subject, are quoted. His criticisms are unsupported by any argument worthy of the name, and mainly consist in an oracular repetition of opinions expressed by him 30 years ago, before a tithe of the fossils now listed had been described or even discovered.

We are told that we argue in a circle, and that the pure assumption was first of all made that Muddy Creek and Schnapper Point were Eocene, the other beds resembling them of course then coming into the same category. We can only characterise such a remark as a simple impertinence.

Sir F. McCoy appears to object to any Australian deposits being called Eocene unless the fossil species are identical with those occurring in the London Clay, Paris Basin, or other European Eocenes, peculiar Australian species being open to grave suspicion. The Australian fauna and flora are markedly peculiar at the present day, and is it likely that a different state of things obtained in Eocene times?

It is further said that, as an examination of the polyzoa just completed shows 12 per cent. of recent species in the Muddy Creek and Schnapper Point beds, these cannot be Eocene. We have not yet seen the descriptions alluded to, but remark that the polyzoa are not an accepted basis for the classification of Tertiary strata.

Finally, we make the emphatic statements, and challenge Sir F. McCoy to disprove them, (1) that the proportion of recent species in the Muddy Creek and Schnapper Point beds is less than $3\frac{1}{2}$ per cent., which is Sir Charles Lyell's limit for an Eocene fauna; and (2) that the facies of their mollusca is characteristically Eocene when compared with those of the Paris Basin.

a minor zone of the Eocene may possibly be demonstrated—at any rate, the matter is worthy of further research.

At the north end of the section, in the topmost clays, near Bird Rock, Mr. Mulder has pointed out that *Ancillaria hebera* is a very frequent shell, though quite rare in other parts of the beds. Further peculiarities of the fauna have also been traced, which induce him to think that these clays mark a minor zone of deposition.

Appendix.

In No. VIII. of the Progress Reports of the Geological Survey of Victoria issued last year, notes (accompanied by a list of fossils) are contributed by Mr. James Stirling concerning the age of the lower members of the Tertiaries in Victoria, in the course of which some remarks by Professor McCoy, criticising adversely our views on the subject, are quoted. His criticisms are unsupported by any argument worthy of the name, and mainly consist in an oracular repetition of opinions expressed by him 30 years ago, before a tithe of the fossils now listed had been described or even discovered.

We are told that we argue in a circle, and that the pure assumption was first of all made that Muddy Creek and Schnapper Point were Eocene, the other beds resembling them of course then coming into the same category. We can only characterise such a remark as a simple impertinence.

Sir F. McCoy appears to object to any Australian deposits being called Eocene unless the fossil species are identical with those occurring in the London Clay, Paris Basin, or other European Eocenes, peculiar Australian species being open to grave suspicion. The Australian fauna and flora are markedly peculiar at the present day, and is it likely that a different state of things obtained in Eocene times?

It is further said that, as an examination of the polyzoa just completed shows 12 per cent. of recent species in the Muddy Creek and Schnapper Point beds, these cannot be Eocene. We have not yet seen the descriptions alluded to, but remark that the polyzoa are not an accepted basis for the classification of Tertiary strata.

Finally, we make the emphatic statements, and challenge Sir F. McCoy to disprove them, (1) that the proportion of recent species in the Muddy Creek and Schnapper Point beds is less than $3\frac{1}{2}$ per cent., which is Sir Charles Lyell's limit for an Eocene fauna; and (2) that the facies of their mollusca is characteristically Eocene when compared with those of the Paris Basin.

Treatment after Circumcision in the Hermit Hill Tribe, Daly River, Northern Territory.

By Knut Dahl.

Communicated by E. C. Stirling, M.D.

[Read July 2, 1895.]

One day in rambling through the swampy woods to the south of the Daly River I came across a small encampment of blacks belonging partly to the Hermit Hill and partly to the Mollak Mollak tribes. In the camp were two boys—brothers—who had recently been circumcised; besides these there were an old woman, their mother, three or four young male relatives, and a lubra belonging to one of the two boys. The convalescents were sitting on the ground under a tree, each with his penis in a paper-bark bandage fastened on to his belt with a frequently doubled piece of twine made out of hair. Their sad and dejected features lit slightly up when I presented them with a piece of tobacco, and upon my request one of the boys began to remove the curiously arranged bandage. He first undid the strings of fibre which encircled the strap of hair-twine and paper-bark, then removed the paper-bark, and exposed a little mat of woven grass that was wrapped round an inner layer of very fine paper-bark next to the wound. The penis was greatly swollen and in a state of inflammation that seemed to cause the boy great suffering. I was just wondering what means they used for healing such a painful and, if neglected, serious wound, when my eye rested on a sheet of paper-bark which I ascertained covered a hole dug in the ground about a foot in depth and width. In the centre of the sheet of paper-bark was a hole about two inches in diameter and burnt at the edges. On my inquiring the use of such an arrangement, the boy answered, "Him cook him 'long hot fellow stone." I asked when the performance would take place. "Close up," he said; so I sat down, anxious to see this radical treatment put in practice, and waited until some stones which were lying in the fire were sufficiently heated. When the stones were glowing a boy brought some wet moss from an adjacent lagoon. The paper-bark sheet was then removed from the hole, some old rubbish raked out, and some wet moss put in its place. Two or three of the red-hot stones were then thrown into

the hole, covered up with more wet moss, and some water poured in. Presently the paper-bark sheet was replaced, with the hole over the centre of the cavity, through which a column of hot vapor ascended. In the meantime one of the circumcised boys had removed all the bandages from his penis, walked to the paper-bark sheet, and laid flat upon it, with his penis inserted through the steaming hole; his arms were along his sides, the palms clasping the thighs, and the toes turned towards the axis of the body. During the five to ten minutes in which the hole continued to emit its vapor a convulsive shivering several times shook the aboriginal's body, and the young man, or rather boy, who superintended the performance then laid himself on the top of the patient, and so prevented any attempt to rise.

Notes on Carabidæ from Lake Callabonna, Central Australia.

By Thomas G. Sloane.

Communicated by Rev. T. Blackburn.

[Read July 2, 1895.]

The interesting collection of *Carabidæ* made by Mr. A. Zietz, of the Adelaide Museum, at Lake Callabonna in September, 1893, has been placed in my hands for examination; and I offer the following notes as the result of my investigation of the thirty-seven species contained therein. The types of the new species belong to the Adelaide Museum.

Neocarenum Blackburni, *n. sp.*

Elongate, robust, parallel, convex; prothorax a little wider than long, widely rounded behind; elytra convex, smooth, impunctate, base deeply emarginate; anterior tibiæ bidentate; intermediate tibiæ strongly bidentate externally. Black.

Head large, transverse (4·5 x 6·5 mm.), lightly convex, smooth, transversely impressed across occiput; frontal sulci deeply impressed, strongly curved, diverging greatly backwards, anterior part of their course very lightly marked, and not reaching margin of head; space between frontal sulci wide, not elevated; pre-ocular sulcus widening into a broad depression anteriorly; pre-ocular process forming a strong triangular projection; eyes deeply enclosed in orbits; lower edge of orbit thick, and forming a ridge below posterior part of eye; suborbital channel (to receive antennæ) oblique, very deep, distant from eye; two supra-orbital punctures on each side placed close together at base of space between frontal sulci and eyes; genæ (between suborbital channel and buccal fissure) divided from submentum, striate. Labrum with anterior margin rounded and advanced in middle. Labial palpi with last joint widely securiform. Antennæ thick, moniliform, incrassate; joints 5-11 compressed, grooved on edges, second joint very little longer than third. Prothorax a little broader than long (7·7 x 8 mm.), widest a little behind anterior angles, lightly convex, not declivous behind; sides almost parallel between marginal punctures, a little narrowed to base behind posterior marginal puncture; anterior margin truncate; base wide, evenly and lightly rounded; anterior angles widely rounded, not marked; posterior angles very obtuse, lightly

marked; border thick, extending round anterior angles and across base, very little reflexed on sides, more strongly so between the posterior marginal punctures (*i.e.*, on base and posterior part of sides), thickened and most prominent at basal angles; marginal channel wide on sides, narrow on base; median line linear, very lightly impressed; two marginal punctures on each side, the anterior about 1·5 mm. from anterior angle, the posterior about same distance from posterior angle. Elytra of same breadth as prothorax (14 x 8 mm.), widest behind middle, a little narrowed to base, widely rounded at apex, very convex, impunctate, sub-opaque (covered with minute scratches); base roundly and deeply emarginate between shoulders, abruptly declivous to peduncle; shoulders prominent; lateral border finely reflexed; a row of umbilicate punctures along lateral margin, two punctures on basal declivity of each elytron about middle of width; inflexed margin narrow behind first ventral segment. Prosternum sloping to peduncle (not vertical on base), widely and lightly excavate between coxæ. Ventral segments smooth, impunctate; suture between second and third well marked in all its course. Legs not long, rather heavy; femora compressed; anterior short, wide, thick, very lightly sinuate on lower side near apex; anterior tibiæ wide towards apex, bidentate; external ridge forming a slight but marked projection above upper external tooth; inferior ridge weakly developed, irregular, not serrate; apical plate forming a thick prominent projection below tarsus; intermediate tibiæ thick towards apex, strongly bidentate externally, the anterior tooth at apex, the upper (strong, erect, triangular) about apical third; posterior coxæ and trochanters impunctate.

Length, 28; breadth, 8 mm.

This species differs conspicuously from *N. elongatum*, Macl., in having the elytra without the submarginal row of large punctures, and in having the intermediate tibiæ bidentate externally. In these respects it resembles *N. retusum*, Bates, to which it is evidently closely allied; but, judging from the description of *N. retusum*, differs in the anterior tibiæ, which are bidentate externally, not tridentate (in *N. Blackburni* the external ridge forms a rather prominent, though not dentate, projection above the upper external tooth, but the tibiæ cannot be said to be tridentate), and have the inferior ridge and apical plate not differing much from those of *N. elongatum*, not with "two broad conspicuous teeth," as in *N. retusum*. *N. Blackburni*, too, seems a more convex species, and probably has the humeral angles of the elytra less strongly dentate. From *N. parviceps*, Sl., a species that has the elytra impunctate, it differs greatly in facies, being more convex, the head larger, with the eyes more deeply embedded n the orbits, the prothorax less transverse, the intermediate

tibiæ bidentate externally, &c. A specimen of this species was also brought from Ayer's Rock by the Horn Exploring Expedition of 1894.

Pogonus hypharpagioides, *n. sp.*

Male. Oval, robust; head large, convex; prothorax a little broader than long, not sinuate on sides before base, apex and base of equal width (1·5 mm.); elytra striate, the striæ simple, obsolete near base, a short striole at base of first interstice, third interstice tripunctate.

Testaceous. Head smooth, convex, broad across base, widely and feebly impressed on each side between antennæ; clypeal suture distinct; clypeus large, truncate; eyes convex, not prominent, lightly enclosed behind. Mandibles stout, hooked at apex; scrobe with a setigerous puncture towards apex. Labrum transverse, subtruncate (very lightly emarginate), sexsetose on anterior margin. Mentum with a short wide emarginate median tooth. Palpi: maxillary with penultimate joint a little longer than apical, incrassate; apical joint dilatate about basal third, narrowed to apex (apex obtuse); labial with penultimate joint long, narrow; apical joint shorter than penultimate, subcylindrical, dilatate in middle, narrowed to apex, subtruncate. Antennæ rather short, subfiliform; first four joints cylindrical; first much thicker than others, about as long as third; second shorter; seven apical joints of about equal length, compressed; three basal joints glabrous (a few long setæ at apex of third). Prothorax a little broader than long (2 x 2·1 mm.), widest a little before middle, smooth, convex; anterior margin truncate; base roundly truncate; sides lightly rounded; anterior angles obtuse, very close to head; basal angles obtuse; border narrow and reflexed on sides, thick and not reflexed on base, a short projecting prominence on each side just before basal angles bearing the posterior marginal puncture; marginal channel very narrow, passing evenly round each basal angle; median line linear, lightly impressed; lateral basal impressions near each basal angle, wide, round, shallow, a wide, transverse impression connecting them. Elytra convex, short, oval (4·5 x 2·8 mm.), widely and evenly rounded at apex; base truncate, much wider than base of prothorax; three inner striæ strongly marked on disc, fourth and fifth very lightly marked, sixth and seventh obsolete; the striæ obsolete, or very faint, towards base, and faint on apical declivity; eighth stria deeply impressed, diverging from margin some distance behind shoulders; three inner interstices a little convex in middle of length, ninth wide, convex, punctate on course of eighth stria; border narrow; basal border with posterior margin sloping forward on each side to humeral angles. Legs light;

tarsi setose on upper surface, two basal joints dilatate and squamulose beneath.

Length, 7·25; breadth, 2·8 mm.

This species has a general resemblance to the species of the genus *Hypharpax;* it is very distinct from the two previously described Australian species. I am inclined to believe the specimen before me to be immature, and think it possible the proper color of the insect may prove to be much darker. The penultimate joint of the labial palps seems to have about four setæ on the inner side; of these the two nearest the apex are close together, and the joint is a little incrassate towards the apex after them.

Pogonus Zietzi, *n. sp.*

Narrow, elongate, depressed; prothorax cordate; elytra flat on disc, lightly striate, a striole at base of first interstice, third interstice tripunctate.

Head and prothorax piceous brown; elytra pale-testaceous, infuscate near scutellum; legs testaceous; antennæ ferruginous. Head transverse, a little narrowed behind eyes, smooth; clypeal suture obsolete; clypeus feebly impressed on each side near base of mandibles; eyes prominent. Mandibles short, stout, hooked at tip; scrobe with a setigerous puncture towards apex. Ligula transverse, truncate, two long setæ placed together in middle; paraglossæ narrow, extending a little beyond ligula. Mentum deeply emarginate, with a short, simple, widely-triangular median projection. Maxillæ sharply hooked at apex, fringed with hairs on inner side; outer lobe biarticulate. Palpi: maxillary with penultimate joint cylindric, incrassate; apical joint thick, obtusely truncate, about same length as penultimate; labial with penultimate joint narrow, elongate, three fine setæ on inner side; apical joint shorter, subcyclindrical, lightly arcuate on outer side, dilatate in middle, apex thick, obtusely truncate. Labrum short, transverse, sub-truncate (hardly emarginate). Antennæ slender, elongate, filiform, very lightly compressed; first joint thick, about as long as third; second shorter; two basal joints glabrous; third pubescent on apical half. Prothorax smooth, cordate (1·25 x 1·5 mm.), widest considerably before middle, depressed on disc, truncate in front and behind; sides shortly rounded to anterior angles, evenly and decidedly narrowed to base; anterior angles rounded off; basal angles not marked; lateral border finely reflexed; lateral channel narrow, terminating a little before the actual base at posterior marginal seta; median line fine, lightly impressed; lateral basal impressions short, wide, extending to margin at basal angles; space between each basal impression and margin not carinate. Elytra narrow, parallel (3·6 x 2 mm.), flat on disc, evenly rounded at apex; base trun-

cate; humeral angles rounded; striæ finely impressed, two inner distinct and punctulate on disc, others weak (or obsolete), only first attaining apex, eighth weak on sides, its course well marked and punctate towards apex; ninth interstice with a few fine punctures on apical curve. Femora dilatate in middle. Male with two basal joints of anterior tarsi dilatate and squamulose beneath.

Length, 6·5; breadth, 2 mm.

This species might at first sight be taken for a species of *Dromius;* indeed, its appearance is so different from the other Australian species of *Pogonus* that it probably should be referred to a different genus, but, as I have been unable to see any of the recent studies of the Pogonides, I prefer to leave it in the genus *Pogonus.*

Note.—I believe the four described Australian species of *Pogonus* are now before me, therefore the following tabulation of them may be useful :—

A. Prothorax with sides strongly sinuate before basal angles (color of upper surface green).
  b. Form rather broad, depressed; prothorax with a short elevated ridge on inner side of lateral channel near basal angles. ... ... *cardiotrachelus*, Chaud.
  bb. Form narrow, cylindrical; prothorax without a sub lateral ridge near basal angles. ... *australis*, Chaud.
AA. Prothorax without any lateral sinuosity before base.
  c. Form stout, convex. ... ... *hypharpagioides*, Sl.
  cc. Form narrow, depressed. ... ... *Zietzi*, Sl.

Loxandrus australiensis, *n. sp.*

Oval, depressed; prothorax not punctate on sides of base, transverse, apex and base of equal width (2 mm.); elytra oval, crenulate-striate, third interstice unipunctate (the puncture placed considerably before the middle). Black, shining; tarsi, antennæ, and palpi piceous.

Head smooth; eyes convex, prominent. Prothorax lightly transverse (2·2 x 2·6 mm.), widest just behind anterior marginal puncture, smooth, lightly convex; sides strongly rounded, lightly narrowed in front, obliquely and decidedly narrowed to base; anterior margin subtruncate (hardly emarginate); base truncate; basal angles obtuse; border narrow, reflexed, obsolete on middle of anterior margin and on base between lateral impressions marginal channel very narrow; median line lightly impressed in middle, not reaching base or apex; lateral basal impressions elongate, narrow, deep; posterior marginal puncture at basal angle (border not widened to receive it). Elytra broad, oval (5·7 x 4 mm.); apical curve decidedly sinuate on each side;

striæ deeply impressed (fifth, sixth, and seventh weaker), strongly crenulate, first flexuous (curving towards suture) near base, seventh obsolete towards shoulder for about one-fourth of length; interstices flat, four inner ones a little convex, ninth punctate along course of eighth stria; border narrowly reflexed on sides, very little raised at humeral angles, and joining the basal border in a wide, not angular, curve. Mestasternum (on posterior parts of sides), metasternal episterna, and ventral segments punctulate. Length, 10; breadth, 4 mm.

Only two of the described species of *Loxandrus* from Australia are known to me, viz., *L. atronitens*, Macl., and *L. iridipennis*, Casteln. Of these *L. atronitens* has the basal part of the prothorax punctulate, and the interstices roundly convex—features that at once separate it from *L. iridipennis* and *L. australiensis*. The conspicuous difference between *L. iridipennis* and *L. australiensis* is in the shape of the prothorax. *L. iridipennis* has the base of the prothorax evidently wider than the apex, the sides being very lightly narrowed to the base, the border extends along the base, is wide on the sides, increasing in width backwards from the anterior marginal puncture and becoming explanate at the basal angles, where it has the posterior marginal puncture placed upon it; while *L. australiensis* has the prothorax more convex, much more strongly rounded on the sides, decidedly narrowed to the base, the border narrow (never explanate), and obsolete on the middle of the base; it has the anterior angles, too, wider and less advanced, and the antennæ a little stouter. The basal border of the elytra is weaker in *L. australiensis* than in either *L. iridipennis* or *L. atronitens*, and the humeral angle is more rounded, with a finer border, which joins the basal border in a rounded curve without a perceptible angle. (The seventh stria of the elytra is obsolete for a considerable distance behind the shoulder; there are sometimes traces of this in specimens of *L. iridipennis*).

RHYTISTERNUS OBTUSUS, *n. sp.*

Oblong, rather convex; prothorax cordate, base (2·8 mm.) narrower than apex (3 mm.); elytra with four inner striæ of each very strongly impressed, the interstices convex. Black, shining; tarsi piceous; palpi and antennæ reddish-piceous.

Head convex, obsoletely transversely impressed behind vertex; frontal impressions strong, diverging backwards; eyes reniform, not so prominent as usual in the genus. Prothorax cordate, transverse (3 x 3·8 mm.), widest about middle, convex, declivous to base; disc lightly transversely striolate; sides rounded on anterior two-thirds, decidedly and obliquely narrowed on posterior third; anterior margin truncate; base sub-truncate, rounded to

basal angles, these obtusely rounded; lateral border thick; lateral channel extending to base; two lateral basal impressions of each side deep, inner short, curving outwards, external elongate-foveiform; space between external basal impression and margin narrow, convex; posterior setigerous puncture placed at extremity of lateral channel. Elytra oval (8 x 4·8 mm.), depressed on disc, more strongly declivous than usual in genus on sides, on base (at each side of scutellum) and at apex; sides subparallel (very lightly rounded); base truncate; apical curve lightly, but decidedly, sinuate on each side; five inner striæ entire, 1-4 deeply impressed, sixth and seventh obsolete, their course hardly indicated, except at apical extremity; fourth interstice convex; lateral border lightly reflexed; basal border joining lateral border at humeral angle with a slight interruption, but without any prominence. Prosternum truncate at base; a linear transverse impression just before base. Ventral segments roughly punctulate, the puncturation extending across the three apical segments.

Length, 13; breadth, 4·8 mm.

This species must be closely allied to *R. cardwellensis*, Blkb., with which it agrees in having the prothorax narrower across the base than across the apex. Judging by Mr. Blackburn's description, the following appear differences between these two species:—The sides of the prothorax in *R. cardwellensis* are described as sinuate before the basal angles—in *R. obtusus* they are not sinuate; and the basal angles of the prothorax, though obtuse, are marked in *R. cardwellensis*—in *R. obtusus* they are quite rounded off. The type of *R. cardwellensis* in Mr. C. French's collection is a male, so that it is possible *R. obtusus* may prove the female of that species, but this I consider extremely unlikely.

Two female specimens were in the collection, one of these (now in my collection) has the striæ of the elytra strongly punctulate, the other (the type) has the striæ a little crenulate; this I think may be a *post-mortem* effect produced by immersion in alcohol, and might not be found in fresh specimens.

Note.—Since the above description was written I have been in Sydney, and have seen the types of *Rhytisternus (Omaseus) Froggatti*, Macl.; the impression left upon me by an examination of that species is that *R. obtusus* is possibly identical with it. However, till specimens are compared, or the range of the species determined, it will be safer to allow *R. obtusus* to retain its specific name, with a query as to the possibility of its identity with *R. Froggatti*.

RHYTISTERNUS STUARTI, *n. sp.*

Oblong, very depressed; prothorax quadrate-cordate, sides sinuate behind, basal angles rectangular, base (3·3 mm.) wider than apex (3 mm.); elytra with four inner striæ of each entire and strongly impressed. Piceous black, shining; legs and antennæ piceous.

Male. Head moderate, convex; frontal impressions deep, short, diverging backwards, connected in front by the lightly marked clypeal suture; clypeus declivous to labrum; eyes prominent. Prothorax transverse (3·3 x 4·75 mm.), widest a little behind anterior marginal puncture, lightly convex towards sides anteriorly, depressed posteriorly; disc depressed, transversely striolate; sides lightly rounded on anterior three-fourths, lightly sinuate before base; anterior margin widely emarginate; base sinuate, lightly emarginate across peduncle, and sloping forward to the basal angle on each side; anterior angles obtuse; basal angles almost rectangular, their summits obtuse; lateral border thick, reflexed in front of basal sinuosity; median line lightly impressed; two lateral basal impressions placed in a wide depression on each side; the internal short, strongly impressed; the external more strongly marked, wide and arcuate; space between internal basal impressions lightly convex, that between external impression and margin narrow, convex, bearing at its base the posterior marginal puncture. Elytra depressed, wider than prothorax (9 x 5·7 mm.); sides subparallel, decidedly narrowed to humeral angles; base truncate; apical curve lightly and widely sinuate on each side; striæ simple, four inner ones strongly impressed, entire, fifth lightly impressed, sixth and seventh obsolete, except posteriorly, ninth and marginal channel as usual in genus; interstices flat; lateral border narrow, reflexed; basal border forming a prominent obtuse projection at each humeral angle above its junction with lateral border. Prosternum truncate at base; a linear impression just before basal margin, causing the base to appear weakly bordered. Ventral segments smooth in middle, finely rugulose-punctate laterally.

Length, 14·5—15·25; breadth, 5·7—6·1 mm.

The female is a little wider than the male, but does not differ otherwise, except sexually as usual in the genus.

In shape and general appearance, this species is closely allied to *R. carpentarius*, Sl., the conspicuous differences being that only the four inner striæ of the elytra are strongly impressed (not five as in *R. carpentarius*), and none of the interstices is convex (in *R. carpentarius* the five inner are); it is, besides, a smaller and much flatter insect, and has the sinuosity of the apical curve of the elytra less marked. From *R. liopleurus*, Chaud., its more depressed form and more transverse prothorax

decidedly separate it. It also resembles *R. callabonnensis*, Sl., but may be readily distinguished by its larger size, more depressed form, and the shape of the prothorax, which is broader, more quadrate, and strongly sinuate behind, with much more prominent basal angles.

Named in memory of the greatest explorer of Central Australia, John McDouall Stuart.

RHYTISTERNUS CALLABONNENSIS, *n. sp.*

Oblong, depressed; prothorax subcordate, base (3 mm.) a little wider than apex (2·75 mm.), basal angles obtuse, but marked; elytra with four inner striæ impressed, the interstices flat; ventral segments strongly rugulose-punctate. Black, shining; tarsi and palpi reddish-brown; antennæ piceous.

Male. Head moderate, convex; frontal impressions short, strong, diverging backwards, connected in front by the clypeal suture; clypeus strongly declivous to labrum; eyes prominent. Prothorax transverse-cordate (2·9 x 3·9), widest a little behind anterior marginal puncture, convex towards sides; disc depressed posteriorly, obsoletely transversely striolate; sides rounded, lightly subsinuate before basal angles; anterior margin emarginate; base subtruncate (hardly emarginate) across peduncle, sloping forward to the basal angle on each side; anterior angles obtuse, rather more prominent than usual in the genus; basal angles obtuse; lateral border narrow, thick; lateral channel ending posteriorly considerably before the base; median line lightly impressed; two lateral basal impressions placed in a wide depression on each side; internal deeply impressed, lightly arcuate; external shorter, arcuate, parallel with lateral margin posteriorly; space between internal impressions depressed, but a little convex, that between external impression and margin convex anteriorly, not raised above lateral border posteriorly, bearing at its base a foveiform setigerous puncture. Elytra oval (8 x 5 mm.), shortly narrowed to humeral angles, subconvex (disc depressed); sides subparallel; base truncate; apical curve decidedly sinuate on each side; four inner striæ strongly impressed, simple, entire, fifth, sixth and seventh obsolete, except near apex; four inner interstices flat, hardly convex (sometimes a little convex); basal border forming a decided, though obtuse, prominence above its junction, with lateral border at humeral angle. Prosternum truncate at base, widely transversely impressed just before basal margin. Ventral segments closely punctate; the puncturation coarse near sides, fine but continuous across middle.

Length, 13·3; breadth, 5 mm.

The female is a little flatter than the male, and is not easily separated from the female of *R. Stuarti*, Sl.

Closely allied to *R. splendidus*, Blkb., from which I would note the following characters as distinguishing it; *(a)* the prothorax has the basal angles a little more marked, and the sides faintly sinuate before them, *(b)* the elytra have the fifth stria less strongly impressed, *(c)* the ventral segments are opaque, not smooth in the middle, and not impressed with a transverse sulcus. It must, judging from the description, have a considerable affinity to *R. cardwellensis*, Blkb., but that species has the prothorax more dilatate at its widest part, and narrower at the base.

Rhytisternus arnheimensis, *Casteln?*

Male. Narrow, elongate, rather depressed; prothorax long, subcordate, base and apex of equal width (2·3 mm.), sides sinuate posteriorly; elytra with five inner striæ entire. Black, shining; legs and antennæ reddish-piceous.

Head rather long, widely and obsoletely impressed across occiput; frontal impressions moderate, wide apart, diverging backwards, their apices connected by the strongly marked clypeal suture; eyes (with orbit) reniform, less prominent than usual in the genus. Prothorax narrow, subcordate (2·7 x 3·2 mm.), widest a little before the middle, depressed posteriorly; sides very lightly rounded, lightly sinuate before base; anterior margin hardly emarginate; base sinuate, a little emarginate in middle and sloping lightly and roundly forward to basal angles on each side; anterior angles less obtuse than usual in the genus; basal angles well marked, obtuse at summit; lateral border narrowly reflexed; inner lateral basal impression not strongly marked, linear; spaces between them and margin on each side flat (external basal impression obsolete). Elytra oval (6·8 x 4 mm.), depressed on disc; apical curve sinuate on each side; five inner striæ simple, entire, first and second most strongly impressed, sixth and seventh only decidedly marked posteriorly (their course perceptible nearly to base); interstices flat on disc (two inner ones a little convex), five inner ones convex on apical declivity, ninth narrow, convex, punctate, the punctures interrupted in middle; lateral border narrow, reflexed; basal border interrupted at junction with lateral border. Prosternum roundly sub-truncate, not margined at base. Ventral segments opaque, minutely punctate; this puncturation more marked on basal segments, wanting in middle of segments.

Length, 12; breadth, 4 mm.

The species described above I believe to be *Rhytisternus (Omaseus) arnheimensis*, Casteln., but the description of that species is, unfortunately, too vague to be of any use in identifying

it. The type of *R. arnheimensis* is in the Howitt Collection, where I have seen it, and so know it to be a species of *Rhytisternus*, of narrow shape, with the prothorax cordiform and sinuate before the basal angles.*

PHORTICOSOMUS GRANDIS, *Casteln.*

Several specimens of a *Phorticosomus*, which seems certainly *Ph. grandis*, Casteln., were obtained by Mr. Zietz; one of these is before me, from which I make the following notes as supplementary to de Castelnau's brief description.

Brown. Prothorax broader than long (4·6 x 5·6 mm.), subcordate, truncate on base, a little wider across apex (5·2 mm.) than base (5 mm.); sides lightly sinuate before basal angles; anterior angles projecting; basal angles rectangular, and decidedly marked. Elytra lightly striate; the interstices flat; base truncate; humeral angles not marked; basal border hardly arcuate on posterior margin from fourth stria to humeral angle; abbreviated stria at base of second interstice very short, punctiform.

Length, 18; breadth, 7 mm.

HYPHARPAX HABITANS, *n. sp.*

Male. Narrow, parallel, depressed; prothorax rounded on sides, posterior angles widely rounded, base and apex of equal width (1·5 mm.); elytra deeply striate, interstices without a striole at base of second or a puncture on apical part of third; prosternum punctulate before coxæ.

Black, shining; undersurface and femora piceous-black; tibiæ piceous-brown; antennæ, palpi, and labrum light-brown. Head small; mandibles inconspicuous, hidden by labrum; front with a narrow short oblique impression on each side extending backward towards middle of eye; these impressions connected by the well marked clypeal suture; eyes convex, not very prominent. Antennæ long. Labrum quadrate; anterior margin emarginate. Prothorax smooth, subrotundate, lightly transverse (1·8 x 2·2 mm.), widest a little before the middle, depressed on disc, strongly declivous on sides anteriorly; sides rounded, the curvature extending to the peduncle posteriorly; anterior margin widely and lightly emarginate; base truncate across peduncle; anterior angles obtuse, not marked; basal angles not marked; border narrow, extending along the base; marginal channel very narrow; a wide round well-defined impression (punctate at

* I believe Mr. Waterhouse, who collected *R. arnheimensis*, obtained it when with one of the early transcontinental exploring expeditions; if so, the locality, Arnheim's Land, may be erroneous.

bottom) on each side of base. Elytra very little wider than prothorax (4·2 x 2·5 mm.), parallel on sides, depressed on disc, declivous on sides, lightly declivous to apex; base truncate; shoulders rounded; sinuosity of apical curve obsolete; striæ very deeply impressed, first hardly deflected towards suture near base, ninth interstice punctate towards shoulder and on apical third; lateral border narrow. Prosternum covered with a fine puncturation before coxæ; episterna smooth. Metasternum rugulose in middle and finely punctulate towards sides. Ventral segments minutely punctulate. Lower side of posterior femora with two punctures, very dilatate in middle and forming a strong obtuse projection; posterior tibiæ straight; four anterior tarsi with joints 2-4 dilatate and densely spongiose beneath, those of anterior tarsi very widely dilatate; posterior tarsi with joints 1-4 successively shorter; first not long, about one-fourth longer than second.

Length, 7; breadth, 2·5 mm.

A very distinct and quite isolated species among the Australian Harpalides known to me. I have placed it in the genus *Hypharpax* because the posterior femora have the lower side so strongly dilatate in the middle as to form a sudden obtuse protuberance, which might almost be called dentiform, and because the posterior tarsi have the first joint but little longer than the second. Its nearest allies seem to be the three Australian species that M. de Chaudoir left in the genus *Anisodactylus* (only because he could find no satisfactory features by which to separate them from that genus), but beyond a general resemblance it has little in common with any of them; its black color, dark legs, and the absence of a striole at the base of the second interstice, or a puncture towards the apex of the third, are decided characters distinguishing it from them. It breaks down some of the barriers separating *Anisodactylus rotundicollis*, Casteln., and its allies, from the genus *Hypharpax*: as *H. interioris*, Sl., breaks down some of those between *Phorticosomus* and *Hypharpax;* and is one of those species which help to show the artificiality of genera founded wholly on the sexual characters of one sex.

Hypharpax interioris, *n. sp.*

Oval, depressed; prothorax transverse, sides strongly rounded, base (2 mm.) a little wider than apex (1·8 mm.); elytra much wider than prothorax, third interstice with a lightly impressed puncture just behind beginning of apical declivity. Male with posterior femora not dentate on lower side. Brown, with bronzy tints on upper surface; femora, posterior trochanters, palpi and base of antennæ testaceous; tibiæ, tarsi, and apical part of antennæ a little infuscate; mandibles light brown, the apex black

Male. Head moderate, not large; eyes not prominent. Antennæ short. Prothorax lightly convex, transverse (1·9 x 2·7 mm.), widest about middle, strongly rounded on sides; base very little wider than apex; anterior margin lightly emarginate; base lightly rounded, truncate in middle; anterior angles wide, obtuse, not advanced; posterior angles obtusely rounded, not marked; border wide on sides, narrow and entire on base; lateral margin explanate; median line obsolete; lateral basal impressions wide and shallow. Elytra lightly convex, wide, oval (5 x 3·6 mm.), lightly rounded on sides; sinuosity of apical curve obsolete, though just perceptible at extremity of ninth interstice; striæ lightly impressed, first flexuous near base; interstices flat, second with a short, lightly impressed striole at base, third with a fine puncture on apical declivity, about level with extremity of fifth interstice, ninth punctate, the punctures not widely interrupted in middle. Mestasternum smooth, very finely punctulate on each side. Ventral segments with a few punctures, bearing long setæ scattered over their surface. Posterior femora compressed, dilatate in middle, but without any obvious projection on lower side, a row (more or less double) of not closely-placed punctures, bearing long setæ along outer margin of lower side; posterior tibiæ almost straight; four anterior tarsi with joints 2—4 dilatate (not very broadly) and densely spongiose below; posterior tarsi short, first joint hardly longer than second.

Length, 8; breadth, 3·6 mm.

This species leads off from the typical species of *Hypharpax* towards *Phorticosomus;* probably its nearest ally among described species is *H. Deyrollei*, Casteln., from which it may be distinguished by its wider and less convex shape, the prothorax more rounded on the sides, the different form of the elytral interstices (in *H. Deyrollei* the interstices become narrow and convex at their apex, and the fifth and sixth extend much nearer to the apex than in *H. interioris*), and by the position of the puncture of the third interstice, which is much nearer the apex in *H. interioris* than in *H. Deyrollei.* Note.—The prothorax, though not quite evenly rounded laterally, being a little more obliquely narrowed towards the base than towards the apex, is so much more strongly and evenly rounded on the sides than that of any other *Hypharpax* I have seen, as to make this a most obvious and noticeable feature of the species.

Besides the species dealt with above, the following Carabidæ were brought by Mr. Zietz from Lake Callabonna :—

Calosoma Schayeri, Erich.
Geoscaptus lævissimus, Chaud.
Euryscaphus obesus, Macl.

Philoscaphus Tepperi, Blkb.*
Clivina Frenchi, Sl. (ms.s.).†
" *Blackburni*, Sl. (ms.s.).
" *sp. ?* (aff. *C. obliquata*, Putz.).
" *sp. ?* (aff. *C. debilis*, Blkb.).
" *sp. ?* (aff. *C. dilutipes*, Putz.).
Bembidium jacksoniense, Guer.
Pogonus cardiotrachelus, Chaud.
Chlœnioidius herbaceus, Chaud.
Rhytisternus cyathoderus, Chaud.
Dicrochile Goryi, Boisd.
Platynus marginicollis, Macl.
Lebia benefica, Newm.
Dromius crudelis, Newm.
Trigonothops nigronotatus, Chaud.
Gigadema longipenne, Germ.
" *sulcatum*, Macl.
Diaphorus (Zuphiosoma) fulvus, Casteln.
Chlœnius australis, Dej.
" *læteviridis*, *Chaud.*
Oodes Waterhousei, Casteln.
Anisodactylus rotundicollis, Casteln.
Hypharpax vilis, Blkb.

---

* The Rev. Thos. Blackburn has sent me specimens collected by Mr. Zietz, under the name of *Ph. Tepperi*, Blackb.; they are so close to *Ph. tuberculatus*, Macl., that I am unable to find characters by which to distinguish them from that species. The upper edge of the lateral groove of the elytra is interrupted a little before the middle in *Ph. tuberculatus*, though to a less degree than in the Callabonna specimens ; these, however, vary *inter se* in respect to the decidedness of the interruption. The tubercles of the disc of the elytra are less marked in the Callabonna specimens than in typical specimens of *Ph. tuberculatus*, but this is a character that varies in *Ph. tuberculatus*.

† These species of *Clivina* will be treated of in a revision of the Australian Clivinæ, on which I am now engaged.

Additional Plant-remains from the Leigh Creek Coal-field, Central Australia.

By R. Etheridge, Junr., Curator of the Australian Museum, Sydney.

[Read August 6, 1895.]

1. Introduction.

The plant-remains about to be described form part of a collection made by Mr. George Sweet, of Brunswick, Melbourne, during a late tour through the fossiliferous Mesozoic area of Central Australia, and were kindly lent to me by him for description.

The fossils are of great interest, as establishing the presence of at least eight specific forms, in addition to those already enumerated by me in Reports* published by the Government Geologist of South Australia (Mr. H. Y. L. Brown).

The three species already determined are the following :—

Thinnfeldia odontopteroides, *Morris.*
Macrotæniopteris wianamattæ, *Fiestm.* ?
Thinnfeldia media, *Ten. Woods.*

I presume that the present series forms a portion of that exhibited† to the Royal Society of South Australia on October 17th, 1893, by Prof. R. Tate, on Mr. Sweet's behalf, and which contained the following species :—

" Thinnfeldia odontopteroides, *Morris.*
" media, *Ten. Woods.*
Tæniopteris, two species.
Equisetum, "
Macrotæniopteris wianamattæ, *Fiestm.*
Trichomanides laxum, *Ten. Woods* ?
Otozamites, *n.sp.*"

The specimens submitted to me are not all sufficiently perfect for specific determination, but still are of great importance as showing the presence in the Leigh Creek deposit of unsuspected genera, and comprise :—

Equisetum, *sps.*
Tæniopteris (Oleandridium ?) fluctuans, *sp. nov.*
" [cf. T. (Oleandm.) tenuinervis, *Brauns*].
Anthrophyopsis ? *sp. ind.*

---

* S. Australian Parl. Papers, 1891, No. 158, p. 10 ; *Ibid*, 1893, No. 158 Suppl., p. 8.

† Trans. R. Soc. S. Austr. for 1892-93 [1893], xvii., p. 355.

Thinnfeldia odontopteroides, *Morris.*
Alethopteris [cf. A. australis, *Morris*].
Frenelopsis, *sp. ind.*
Podozamites [cf. P. lanceolatus, *L.* and *H.*].

2. Description of the Plant-remains.

Equisetum, *sps.*

Obs.—There are two compressed fragments of *Equisetum*, probably distinct from one another. One is three and a half inches long by one inch wide, containing within the length two nodes, and portions of three internodes. The surface is delicately striate.

The other example is three inches long and three-sixteenths of an inch wide, with five nodes, and portions of six internodes. On the flattened surface there are six longitudinal grooves continuous throughout. The specimens are too imperfect to render comparisons with published species of any practical value.

Tæniopteris (Oleandridium ?) fluctuans, *sp. nov.* Pl. v., figs. 1-3.

Sp. Char.—Frond simple (so far as known), elongately lanceolate, thick, coriaceous, crumpled, lateral margins sinuous. Mid-rib thick, moderately wide, and possibly longitudinally striate; secondary veins fine, straight, two in the space of one and a half mm., passing from the mid-rib at a right angle, sparsely furcate, and when so generally on immediately leaving the mid-rib, very rarely in the middle of the wing.

Obs.—When in the perfect state this must have been a remarkably fine leaf. It is now eight inches long, and incomplete at either end. The lower portion exhibits only the mid-rib and fragments of one of the wings attached. The breadth of the full frond where preserved is one and a quarter inches. The general facies of the frond seems to point to *Oleandridium* rather than *Tæniopteris* proper, but we know nothing of the fructification of the plant. If an *Oleandridium* it is near *O. vittatum*, Brong.,* although Brongniart's figures do not show any fluctuation of the margins, nor crumpling of the surface. On the other hand, Fiestmantel's illustration† of the Indian variety of this species decidedly manifests a sinuosity to each margin, and the fronds are to some extent crumpled also.

The question arises, in how far is this crumpling a natural or superinduced character? If the former, it will stand as a good specific character, and is certainly the first Tæniopterid I have seen from Australian rocks with this peculiarity.

---

* Hist. Vég. Foss., 1828, I., t. 82, f. 1-4.
† Pal. Indica (Gondwana Flora), 1876, II., pl. i. t. 1.

The proximal end is not clearly preserved, but there is some indication of a scar of attachment.

The secondary veins on the narrow wings at the base are well preserved, and appear to be wider apart than on the broader or upper portions. The furcation is also very distinct, and takes place at a slightly more distant point than on the latter. A subdivision of the secondary veins on the broader portions of the frond is not common, but one is shown at about the centre in fig. 3 ; this is, therefore, a second subdivison. A peculiar tertiary subdivision occasionally although rarely, takes place near the margin (fig. 3), and when so several veins in this condition are clustered together. The primary furcation is also peculiar in that it occurs in immediate contiguity to the mid-rib, almost assuming the appearance of two parallel veins issuing from the same initial point. That this is not the case, however, is shown by the secondary veins in the narrow basal portion of the frond.

Oleandridium vittatum, Feistm., differs from the South Australian fossil by its irregular furcation, and the secondary veins are often more than once furcate.

A gentle fluctuation of the margin is shown in Nathorst's figure* of *O. tenuinerve*, Brauns ; indeed, this irregularity of the frond edges is quoted by Schimper as one of the specific characters. The secondary nerves are said to be furcate at the base only. On the whole *O. tenuinerve* is the nearest approach to our form that I have been able to find, although probably distinct. As regards size, an Australian described species, *T. Carruthersi*, Ten. Woods, may be compared to *T. (Oleandridium ?) fluctuans*, the name I purpose applying to the present frond, judging by the large fragments of it that have been published by Feistmantel from South Africa.†

Tæniopteris, *sp. ind.* Pl. iv., fig. 1.

Sp. Char.—Frond linear spathulate, four to five inches long and five-eighths of an inch wide, probably petiolate ; margins entire, not fluctuating ; surface plain, not crumpled. Mid-rib very strong, one-sixteenth of an inch wide ; secondary veins briefly issuing from the mid-rib at an acute angle, then diverging at a much more obtuse one, and proceeding to the margins more or less horizontally, one in the space of half a millimetre, and apparently all simple.

Obs.—This frond is so like many Tæniopterids that it is rendered difficult of determination. The substance of the frond, except here and there, has been converted into coaly matter, so that the entire venation has not been preserved for inspection,

* Floran vid Bjuf, 1878, I., t. 10, f. 4 and 5.

† Geol. Pal. Verhältnisse Süd-Afrikas, 1889, I., t. 2, f. 6-10.

but wherever visible appears to be simple, and in no way furcate. If this be the case it will afford a good character for future identification.

The frond outline is similar to that of *Angiopteridium M'Clellandi*, O. and M.,* but the neuration, according to Oldham and Morris, is occasionally dichotomous. Feistmantel's additional figure† of the Indian plant quite bears out his predecessor's description. At the same time Zeiller has given a representation‡ of this fern in which the neuration is quite simple, as that from Leigh Creek is believed to be.

In the simplicity of its veins and general form of the frond the present one agrees very closely with the simple-margined varieties of *O. tenuinerve*, Brauns, even more closely than *O. fluctuans*, mihi, does. Both Nathorst's figure previously quoted and another given by Schenk§ as *O. tenuinerve* are equally like the present fossil, but it differs considerably from *O. lentriculiforme* lately described|| by me from intercalated shale in the Hawkesbury Sandstone.

Anthrophyopsis ? *sp. ind.* Pl. iv., fig. 2.

Obs.—A large imperfect frond is in the collection that may possibly be referable to this genus. There is no trace of a mid-rib, but the elongated mesh-reticulation of the secondary veins described by Nathorst, the author of the genus, in his "Flora of Bjuf" are well displayed. In the absence of any contrary characters, I have no option but to provisionally refer the Leigh Creek plant to *Anthrophyopsis*.

Nathorst figures two species in the above work differing a good deal in the venation. In *A. crassinervis*¶ what may perhaps be called the proximal venation occasionally forms a large elongate mesh, but towards the margins this becomes much stronger and closer. In *A. Nilssoni*,** Nathorst, the mesh is of equal size throughout, but so far resembling the former that the reticulation is large. In his "Flora of Häganäs," Nathorst gives a more complete figure of *A. Nilssoni*, and describes a third species—*A. obovata*, but in neither of these is the base of attachment shown.

The frond, now before me, resembles a fish-tail in general outline and expands rapidly towards the distal end. The base of attachment is widely subauriculate, the sides of the frond then

---

* Pal. Indica (Gondwana Flora), 1863, I., pt. 1, fascic. 5, t. 23.
† *Ibid.* 1877, pt. 2, p. 96, t. 46, f. 5 and 6.
‡ Ann. des Mines, 1882, Livr. Sept.-Oct., t. 10, f. 5.
§ Foss. Flora Grenzsch., 1868, Atlas, t. 25, f. 3 and 4.
|| Records Geol. Survey, N.S. Wales, 1894, IV., pt. 2, p. 49.
¶ Floran vid Bjuf, 1878, I., t. 7, f. 3 and 4.
** Floran vid Bjuf, 1878, I., t. 7, f. 5.

narrowing and suddenly expanding. The outer or distal extremity of the frond is unknown. There is no mid-rib, the well-marked neuration radiating and following the outline of the frond. The veins are equal in size, some twice and others thrice dichotomous, certain of them again uniting at long intervals to form an exceedingly elongated hexagonal, or rarely polygonal, equal-sized mesh, more particularly in the basal third of the frond; they are slightly thickened immediately before dichotomization, and the branched or dichotomised vein then slightly bending. On the whole, allowing for the slightly radiate character, the veins may be said to be subparallel.

I do not think there can be any question of the remarkable shape of this frond, for although here and there the margins are not preserved, still there is sufficient remaining at other places, more particularly towards the base, to warrant the outline described above; furthermore, the curvature of the venation supports this. There is no sign of a petiole.

Fragments of fronds referred to *Anthrophyopsis* are not unknown from Mesozoic deposits other than those of Sweden. Feistmantel has figured* a supposed fragment from the Lower Gondwana formation of India, which has a neuration with very much the aspect of that of our plant, but perhaps the mesh formed by the reticulation of the veins is larger in the latter than the former. The same author has also described† a supposed example from the South African Karoo formation, but the mesh is much too small for that of the South Australian plant. Feistmantel seemed inclined to regard‡ *Anthrophyopsis* merely as a *Gangamopteris*, but in none of Nathorst's figures is there the peculiar "dissolved" mid-rib of the latter. If the present frond be an *Anthrophyopsis*, it is most nearly allied to *A. Nilssoni*. Whatever its nature may be, one point is certain, not only is it an addition to the Leigh Creek deposit, but also to the Mesozoic rocks of Australia generally.

It would be unnecessary to notice the genus *Ctenis*, as originally figured by Lindley & Hutton, were it not that both Schimper§ and Schenk|| have referred *Tæniopteris asplenioides*, Ett., to *Ctenis*. This is a plant having a close resemblance to Nathorst's *Anthrophyopsis crassinervis*, Schimper remarking that the neuration recalls that of *Glossopteris*. However much Ettinghausen's species may resemble the present form of plant,

---

* Pal. Indica (Gondwana Flora), 1881, III., pt. 3, t. 41*a*, fig. 5.
† Geol. Pal. Verhältnisse Süd-Afrikas, 1889, I., p. 67, t. 2, fig. 4.
‡ Pal. Indica, *loc. cit.*, p. 115.
§ Zittel's Traité Pal., pt. 2, Paléophytologie (French edit.), 1891, p. 131.
|| Palæontographica, XVI., Heft 6, t. 25, fig. i.

Lindley & Hutton's type, *Ctenis falcata*, is exceedingly unlike both.

I shall await with much curiosity further discoveries at Leigh Creek, in the hope that they will solve the true systematic position of this curious frond.

Alethopteris, *sp. ind.* Pl. vi., figs. 1, 2.

Obs.—Fragment of a particularly well-marked fern, that certainly does not possess the typical characters of *Alethopteris australis*, Morris, as we know the latter in Eastern Australia. It is distinguished from this plant by the much shorter and more rapidly falcate pinnules, their upwardly directed set and closely adpressed position.

The pinnules are short, subfalcate, curved, upwardly directed, and touching; the margins are entire towards the apex, and the latter obtuse. The mid-rib in each pinnule is continuous almost to the apex, where it slightly evanesces; the secondary veins are from eight to twelve in each pinnule, and once furcate.

It is almost impossible to ascribe a name to a fragment of this description, but possibly the following comparisons may assist in its determination on the discovery of more perfect specimens. The nearest allies appear to be *A. australis*, Morris, *A. Rosserti*, Presl., and *A. Albertsi*, Schimper. Morris describes* the neuration of *A. australis* as bifurcate or dichotomous. McCoy, on the other hand, writes† as follows:—"The veins are much more commonly forked only once in the Australian plant, as I figure it, than with the second marginal branching, as given by Morris." In the present specimen the veins appear to be once furcate only on each pinnule. There is the possibility, therefore, that it may be only a variety of *A. australis*.

The resemblance is also strong between the Leigh Creek fragment and Zeiller's figure‡ of *A. Rosserti*, Presl., from the coal formation of Tonquin, except again in the neuration, which is twice furcate in the latter. Again, equally like is Schenk's figure§ of *A. Albertsi*, Schimper, from the Wealden beds of N.W. Germany. In this species the pinnules are of the same semi-falcate outline, and the secondary veins are once bifurcate, but, collectively, the pinnules do not present the same degree of regularity.

The pinnules lack the extremely acute and falcate outline of those of *A. whitbiensis*, L. & H.; neither are they as strictly spear-head-shaped as seen in *A. hastata*, Phill.,‖ nor elongate

---

* Strzelecki's Phys. Descrip. N.S. Wales, &c., 1845, p. 248, t. 7, f. 2*a*.
† Prod. Pal. Vict., 1875, Dec. II., p. 17.
‡ Ann. des Mines, 1882, Livr. Sept.-Oct., t. 10, f. 3, 3*a*.
§ Beitrage Flora der Vorwelt (*Palæontographica*), pt. 4, t. 6, f. 4.
‖ Geol. York., 1836, I., t. 8, f. 17.

and widely separated, like those of *A. ligata*, Phill.,* both of which are by some observers believed to be identical with *A. whitbiensis.*

The characteristic Indian fern, *A. indica*, O. & M.,† presents a totally different appearance to our fossil, from its long and more or less acute pinnules. Another Indian plant, *A. (Phegopteris ?) phegopteroides*, Feistm.,‡ on the other hand, in the size, shape, and contiguity of the pinnules, is very like the fragment from Leigh Creek, but the venation is quite simple.

There is no trace of fructification, and it is therefore better not to enter into the question of its generic identity, beyond referring the species to *Alethopteris.*

Thinnfeldia odontopteroides, *Morris.*

Obs.—A few pinnules, oval to sub-reniform in outline represent this species.

Podozamites, *sp. ind.*

Obs.—A single leaf of this well-known genus is in the collection, three and a-half inches long, but still imperfect. The base of attachment is shown, and about twelve parallel simple veins, extending the whole length of the leaf, with the interspaces delicately striate. It is probably allied to, and may even be identical with, the protean species *Podozamites lanceolatus.*

Frenelopsis (?) *sp. ind.* Pl. vi., figs. 3-6.

Obs.—These fragmentary bifurcating branches remind one very strongly in general habit of some of the Mesozoic Coniferæ, such as *Glyptostrobus*, *Athrotaxopsis*, and particularly *Frenelopsis*, but there is an entire absence of scales on our specimen, and, at first sight of stem, articulation also.

The first specimen consists of a short stem, giving off two branches near its fractured base, then bifurcating, each bifurcation again dividing, one twice, and the other once, near the top of the specimen. The main branch bears fine longitudinal, apparently inosculating, striæ, but the subsidiary branches are pitted. At the bifurcation two other branches appear to be given off, but the connection is not altogether clear.

The counterpart exhibits further interesting details, for the impression, here and there, when the carbonised vegetable matter has been removed, shows faint transverse lines, representing, I believe, articulations both on the main and subsidiary branches.

---

* Geol. York., 1836, I., t. 8, f. 14.
† Pal. Indica (Gondwana Flora), 1863, I., pt. 1, Fas. 5, t. 27.
‡ *Ibid*, 1881, III., pt. 3, p. 81, t. 18*a*, f. 1 *a* and *b*.

Fig 1

Fig 2

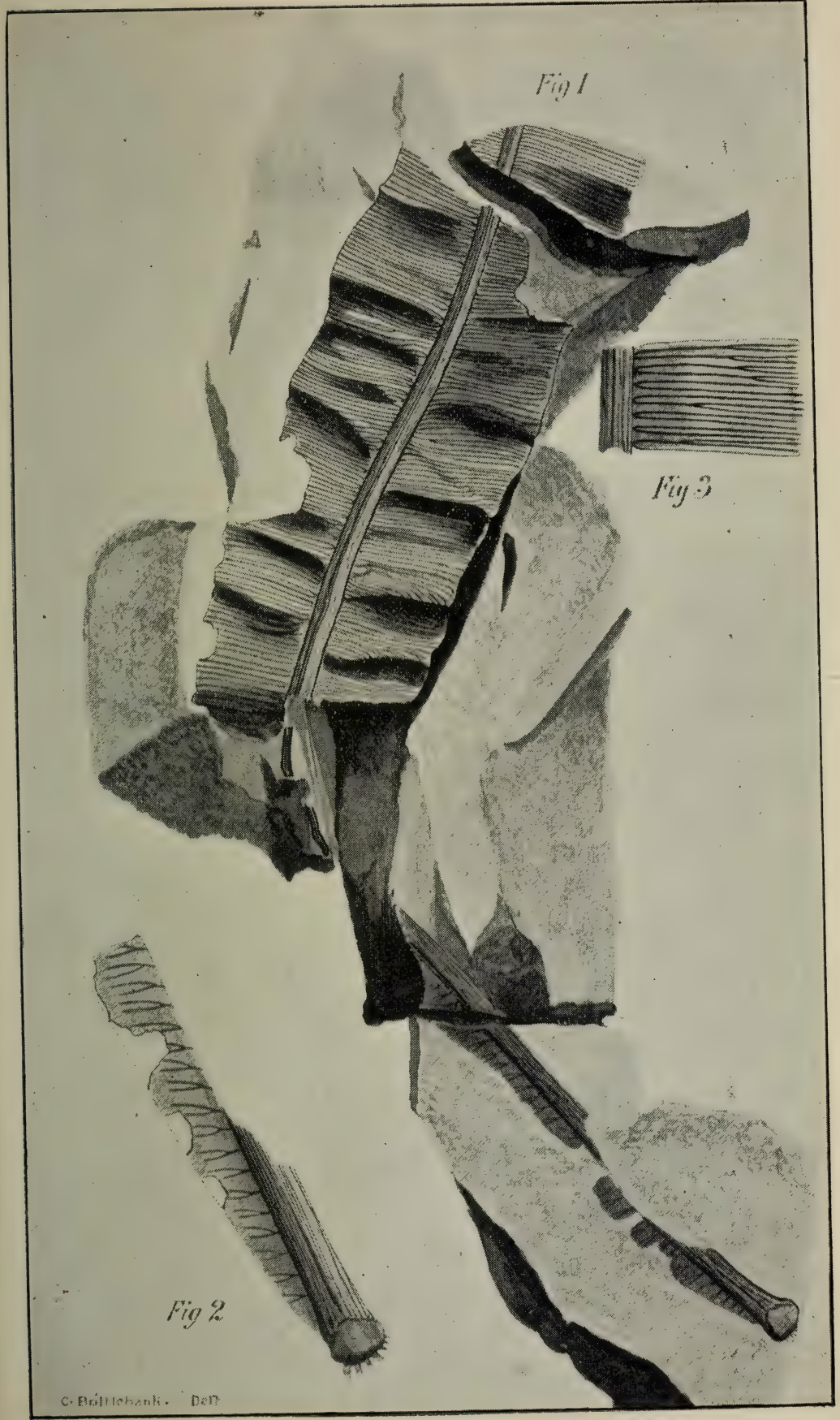


Fig 1
Fig 3
Fig 2
C. Brittlebank. Del.

Fig 6

Fig 3

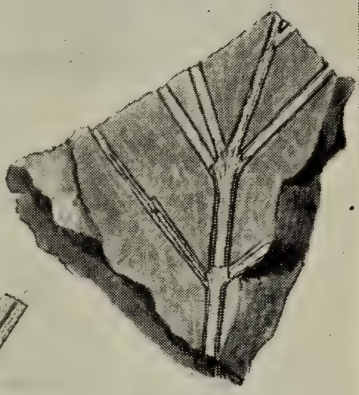


Fig 4

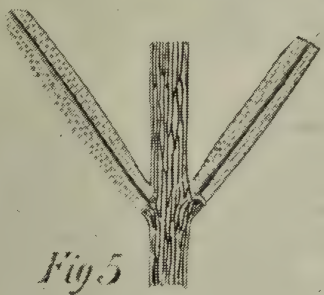


Fig 5

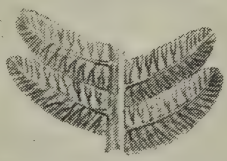


Fig 2

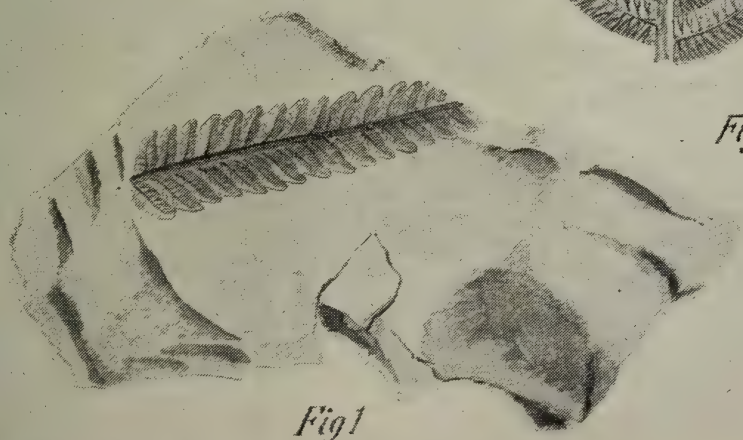


Fig 1

Brittlebank. Delt

It is on account of the method of branching, and the presence of these articulations, that I think the specimen may *possibly* be a form of *Frenelopsis*. In such a case, it is much more like some of the American species than the European, for instance, *F. ramosissima*, Fontaine,* of the Potomac Younger Mesozoic Flora. Touching the disappearance, or faint preservation, of the articulations, it would appear from Fontaine's remarks and illustrations that when the epidermis is lost, and the plant decorticated, the articulating scars become more or less invisible also, and it is in this condition that I take our specimen to be.

The second specimen appears to be the terminal portion of a branch.

EXPLANATION OF THE FIGURES.

Plate IV.

Fig.

1. Tæniopteris (Oleandridium?), *sp. ind.* A Tæniopterid frond, possibly referable to *Oleandridium* and near *O. tenuinerve*, Brauns.
2. Anthrophyopsis? *sp. ind.* An imperfect frond, with a fish-tail proximal end, and a Glossopterid net venation, but no trace of a mid-rib.

Plate V.

1. *Tæniopteris* (*Oleandridium?*) *fluctuans*, Eth. fil. Frond showing crumpled surface and thick mid-rib.
2. Proximal portion twice enlarged, showing the widely separated secondary veins furcate near the mid-rib.
3. Part of the upper portion of the frond much enlarged, showing the secondary veins furcate near the centre, or furcate in clusters near the margin.

Plate VI.

1. Alethopteris, *sp. ind.* Portion of a pinna, showing short sub-falcate, curved, upwardly-directed, and touching segments.
2. Four of the segments, twice enlarged, exhibiting the once furcate secondary veins.
3. Frenelopsis (?), *sp. ind.* Portion of a stem showing the method of branching.
4. The reverse of fig. 3.
5. The lower portion of fig. 3, twice enlarged, showing the inosculating striæ on the main stem, and pitted surface of the branches.
6. A specimen believed to be the terminal branches of this plant.

---

* Mon. U.S. (Powell's) Geol. Survey, 1889, XV., t. 95, 96, 99, &c.

Notes on Victorian and Other Blattariæ and Descriptions of New Species.

By J. G. O. Tepper, F.L.S., &c.

[Read August 6, 1895.]

Some time ago a collection of Victorian cock-roaches from the National Museum, Melbourne, was placed in my hands for determination; it comprised 39 species in 18 genera. Among these were a considerable proportion, viz., 13 species, which I was unable, to my surprise, to refer to any of those hitherto published, and therefore presumably new, while two new genera had to be established. Some of these are very rare, as the very able collector, Mr. Jas. A. Kershaw, assures me, and have only been found in one or a few individuals hitherto. The material being scanty, mostly in a form not permitting the study of the wings, and sometimes defective, the characterization is not quite so definite as desirable; but as the respective species differ very much in other details it was considered advisable to attach names—subject, however, to possible future corrections.

Through the study of some of the above new material I have also been induced to transfer my genus *Temnelytra* from the Phyllodromidæ to the Periplanetidæ on account of the distinctly valvular form of the inferior sexual lamina of the female, and to place it after the genus (or subgenus) Drymaplaneta, mihi, from which it differs in the elytra being much more developed (although not nearly so much as in the winged forms of Periplaneta) and in other details.

Besides the Victorian specimens a small number of others had accumulated in the Museum since my last paper, comprising new forms, or described ones from new localities, or such of which only one sex was known. Several of these, coming from Queensland and Western Australia, were kindly contributed by my friend, C. French, Esq., F.L.S.; the remainder hail from various parts of South Australia. Among these, seven species were recognised as new, and an eighth as also represented in the Victorian collection. The rare types of the latter are in the National Museum, Melbourne, when unique; the remainder also represented in the S.A. Museum.

It may be remarked that, so far as my Australian researches hitherto extend, the Blattariæ exceed every other orthopterous group in number of species and genera. As they are among the

oldest known types of insects, this fact seems to offer additional testimony of the great antiquity of the fauna of this continent.

The works consulted are those of Messrs. Brunner de Wattenwyl, Henry de Saussure, Burmeister, and Stăl.

The species belonging to the Victorian collection have the numbers attached under which they were submitted ; the others are unnumbered and marked by an asterisk preceding the name.

ECTOBIDÆ.

Ectobia apicifera *(Walk.), Tepper.* No. 24.

Kewell, N.W. Victoria.

Ectobia minima, *sp. nov.* No. 25.

Male. Body shining, pale beneath. Head pale tawny, a broad brownish band in front; eyes black ; antennæ brownish. Pronotum subtransverse, a pale whitish median stripe as wide as the space between the eyes and of equal width throughout, on each side bordered by a piceous stripe narrow at the apex, much wider behind, lateral margins broadly pellucid. Elytra much exceeding the abdomen, lateral and sutural margins broadly pale, whitish, medial space piceous. Legs (very long), pectus and base of abdomen pale tawny, spines partly blackish ; apical part of abdomen deep black. Cerci pale.

	Male.
Length of body	4·3 mm.
Length of elytra	4·3 "
Length of pronotum	1·3 "
Width of pronotum	2 "

Hab.—Mordialloc, Victoria. (Nat. Mus., Melbourne.)

The smallest species known to me.

Ectobia sublucida, *sp. n.* No. 40.

Female. Body piceous, banded paler. Head brownish, eyes pale, a dark band between the latter interrupted in the middle, antennæ ferruginous. Pronotum semicircular, angles slightly rounded, lateral margins broadly brownish, disk piceous, with a brownish triangular spot adjoining the straight hind margin. Elytra piceous, lateral margins dull tawny, shorter than abdomen, apex rounded (radial and ulnar veins not separate at base). Legs pale brownish. Abdomen piceous, banded or spotted paler.

	Female.
Length of body	6·5 mm.
Length of elytra	4·6 "
Length of pronotum	1 3 "
Width of pronotum	2·5 "

Hab.—Chiltern, Victoria. (Nat. Mus., Melbourne.)

Resembling *E. lucida*, Br.; it differs from it in the parallel branches of the ulnar veins being all obliquely directed to sutural margin instead of to the apex, the pale eyes, the pale spot of the pronotum, and the smaller size.

ECTOBIA (?) MARGARITA, *sp. n.* No. 46.

Male. Pearly grey, dotted with pale brown. Face blackish, a pale band between the black eyes; vertex finely striped pale and dark; antennæ brownish. Pronotum suborbicular, pale translucent; disk impressed, laterally dotted brownish, hind margin rounded. Elytra long, narrow, of pearly lustre, longitudinal vein and the oblique parallel branches much raised, discal area dotted brown. Wings pellucid, highly iridescent. Legs very slender, banded or dotted brown. Abdomen beneath black towards apex.

	Male.
Length of body	6 mm.
Length of elytra	6·7 "
Length of pronotum	1·2 "
Width of pronotum	1·5 "

Hab.—Grampians, Victoria. (Nat. Mus., Melb.)

The slender form, structure of elytra, &c., render this form easily recognisable.

PHYLLODROMIDÆ.

LOBOPTERA CIRCUMCINCTA, *Tepper.* No. 22.

Dandenong Ranges, Victoria. Male and female. Locality new.

TEMNOPTERYX FERRUGINEA, *sp. n.* No. 7.

Female. Pale ferruginous above, legs and underside tawny. Head pale, antennæ brown, base pale. Pronotum elliptic, reddish yellow, pellucid, hind margin rather convex. Elytra attaining to penultimate segment of abdomen, uniformly ferruginous, anal vein impressed, recurved. Wings shorter than elytra. Claws with plantula and arolia distinct. Abdominal segments banded or clouded with brown, angles very little produced. Supra-anal lamina transverse, trigonal, apex rectangular. Cerci long, acuminate. Subgenital lamina very large, cucullate, entire.

	Female.
Length of body	15 mm.
Length of elytra	10·5 "
Length of pronotum	5 "
Width of pronotum	6·6 "

Hab.—Fernshaw, Victoria. (Nat. Mus., Melbourne.)

This species, with *T. deropeltiformis*, Br., might be included into a separate subgenus distinguished by the greater length of

the elytra and the presence of wings at least in the male. From *Blatta* and *Periplaneta*, although very similar in form, they are separated by the entire subgenital lamina of the female, and from the genus *Phyllodromia* by the abbreviated elytra, &c.

*Paratemnopteryx australis, *Sauss.; id.*, Tepper, Trans. Roy. Soc., S. Aust., 1894, p. 170.

A female captured by me in my house at Norwood is assigned to this species, and agrees in all respects with the original description. A male (found in the Public Library, Adelaide) with perfect wings appears to belong also here. They are easily distinguished from the common "black beetles" *(Peripl. orientalis)*, which they resemble in color, by the subgenital lamina of the female not being valvular as in the latter, &c. The male being still undescribed, the following description is appended.

Male. Elytra and wings perfect—(Female. Elytra very much abbreviated, wings rudimentary or none)—exceeding the body, dull brown. Head shining, vertex dark red, face black; areoles of antennæ and the labrum yellowish, antennæ brown and white annulated. Pronotum shining, disk dark reddish, surrounded by a zone of dark piceous, which is widest behind; lateral margin deflexed, narrowly bordered with red, rotundate; hindmargin nearly straight, angles rounded. Elytra exceeding abdomen by about one-fifth, margins subparallel, apex rounded; veins much raised, branches of ulnary veins parallel, emitted towards apical border; anal vein distinctly recurved; mediastinal area red near base, remainder to first branch blackish; remainder of elytra dull dark brown. Wings as long as elytra, smoky to blackish. Pectus and legs tawny. Tarsi pale, Supra-anal lamina depressed, rather broadly trigonal, apex truncate, slightly concave, apical margin narrowly white. Cerci long, lanceolate, flat, densely ciliate, black above, beneath brown, concave; apex acute. Subgenital lamina short, broad; hindmargin rotundate, entire, black; disk red.

	Male.	Female.
Length of body	15·5 mm.	16 mm.
Length of elytra	15 "	6 "
Length of pronotum ...	5 "	5 "
Width of pronotum ...	7 "	7 "

Hab.—Adelaide. (S.A. Museum.)

The following species differs from the above in its elytra being much longer with the female, the supra-anal lamina being much narrower and ovate instead of trigonal, besides being much smaller. With the male the pronotum is flatter and less rounded, the supra-anal lamina narrower and distinctly emarginate. Neither of the two species exhibits a trace of plantula or arolia.

PARATEMNOPTERYX BLATTOIDES, *sp. n.* Nos. 27, 33, 47 (larva).

Resembling *Temnopteryx deropeltiformis*, Br. Dark brown, concolorous above, underside and legs reddish. Head wholly covered. Pronotum shining, subelliptic, truncate in front, disk rather flat to convex, slightly excavated behind in the middle and with a single impressed dot on each side in front; hindmargin slightly rounded. Elytra of male exceeding the abdomen; of female abbreviate, attaining from one half to two-thirds of the abdomen; in both sexes the anal vein subflexuose, recurved; apex rotundate. Wings of male nearly as long as elytra, of female rudimentary. Supra-anal lamina narrowly trigonal, of female the lateral margin reflexed, disk tectiform. Cerci long, slender. Subgenital lamina arcuate, apex truncate, hindmargin subcrenulate.

	Male.	Female.
Length of body	13 mm.	13–15 mm.
Length of elytra	14 "	8– 9 "
Length of pronotum ...	4 "	4– 4·7 "
Width of pronotum ...	6 "	6– 6·5 "

Hab.—Narre Warren and "near" Melbourne. (National Museum, Melbourne.)

The females resemble the figure of Saussure's *Blatta Conloniana* (*Temn. pennsylvanica*, Deg.) very much in outline, but differ much in size and detail. A female specimen from "Victoria" was also previously presented by C. French, F.L.S., and is in the collection of the S.A. Museum.

*PHYLLODROMIA GERMANICA, *L.; id.*, Tepper, Trans. Roy. Soc., S.A., 1893, p. 41.

In the above paper it was mentioned that the reported occurrence of this European species in Australia required confirmation. In February last several specimens were received from Dr. Stirling, F.R.S., and Mr. Geo. Bednall respectively. These were captured in dwellings in the city of Adelaide, and agree perfectly with the descriptions. They were no doubt introduced by means of the shipping.

PHYLLODROMIA LITURATA, *sp. n.* No. 42.

Dark brownish. Face pale, with a black figure like the Greek capital ypsilon ϒ; vertex black, with a pale zigzag band between the eyes; antennæ setaceous, very finely ciliate, base pale, else dark brown. Pronotum transverse, much rounded in front, slightly convex behind; lateral and foremargin broadly, hindmargin narrowly, whitish; disk black, with a pale figure like some oriental letter or ornamental device, and quite symmetrical. Elytra long, costal margin broadly whitish; inframedial vein

nearly straight, much branched, discal area blackish brown. Legs pale tawny; coxæ with a few dark spots and fine black marginal lines; femora lined black below and with a dark spot near the apex; tibiæ blackish at the apex. Abdomen black or dark brown in the disk above and below, margins broadly pale, dotted black. Supra-anal lamina ? Cerci banded pale and dark. Subgenital lamina large (in the specimen before me quite unsymmetrical, the left side much longer than the right), apex rounded, hindmargin flexuose, black, middle whitish. Style on left side short, slender, placed marginally near angle, on right side obsolete (bisexual ?).

	Male.
Length of body	11 mm.
Length of elytra	11 "
Length of pronotum	2·3 "
Width of pronotum	4 "

Hab.—Western District, Victoria. (Nat. Mus., Melb.)

I cannot find any description fitting this well-marked insect.

APOLYTA PALLIDA, mihi. No. 16.

Hab.—Gippsland, Victoria. Locality new.

APOLYTA DECORATA, mihi. Nos. 11, 14.

Two larvæ of different ages and localities. No differences are perceptible between the typical South Australian and the Victorian specimens.

Hab.—W. Victoria (11); Tatura, Victoria (14). Localities new.

APOLYTA PELLUCIDA, *Brunner*. No. 18.

Hab.—Dandenong, Victoria. Locality new.

Besides this and another specimen presented by Mr. French a third from North Queensland reached the Museum collection. Although all these agree well with the original description, yet differ in minor details. Thus Mr. French's specimen has the black disk of the pronotum longitudinally divided by a reddish stripe, and the black apex of the elytra very small. The Dandenong specimen has the black undivided area of the disk of the pronotum distinctly quadrangular, with the hindangles truncate, and the black patch at the apex of the elytra much larger; while in the Queensland specimen the black area of the pronotum is much reduced in size and hexagonal in shape, and the black color occupies not only about one-fifth of the elytra, but also borders the whole of the sutural margins. All the three differ also in size, Mr. French's specimen being the largest, and that from Queensland the smallest. The ventral segments of the abdomen, except the two last, and the lateral margins above and beneath are bordered white.

Apolyta pallescens, *sp. n.* No. 20, and perhaps 16.

Pale tawny; abdomen brown to black. Face with a black "T"-like figure, a round brown spot between the antennæ, surrounded by a pale border; antennæ pale, hirsute, very slender. Pronotum rounded in front, slightly convex behind, disk with a short brown oblique stripe on each side, united behind by a narrow dark band. Elytra oval, concolorous, costal margin broadly pellucid, disk pale tawny. Legs and pectus pale. Abdomen black above, dark brown beneath, lateral margin broadly pale; also the cerci. Supra-anal lamina trigonal, apex pale, narrowly emarginate.

Length of body	11 mm.
Length of elytra	8·5 "
Length of pronotum	2·7–3 "
Width of pronotum	4·5 "

Hab.—Narre Warren, Victoria. (Nat. Mus., Melbourne.)

This species differs from *A. vestita* by the marking of the face and the pale color of legs, antennæ, &c.; from *A. pallida* in the outline of the pronotum, the marking of the face, and the veins of the elytra not being pale. It and the following species may require a separate subgenus.

Apolyta marginata, *sp. nov.* No. 29 (male), 44 (female).

Pale tawny to blackish. Antennæ dark, except basal joints. Pronotum shining, margins whitish all round, narrow in front and behind, broad laterally, dark area of disk divided by a pale median stripe into two oval or oblong spots. Elytra normal, costal margin broad, whitish; radial vein narrowly black at the base, remainder of veins and veinlets whitish. Legs tawny. Abdomen above banded indistinctly darker, beneath yellowish (male) or blackish (female). Supra-anal lamina triangular, apex acute. Subgenital lamina subcucullate, oval, apex slightly emarginate (male), or keeled and obtuse (female).

	Male.	Female.
Length of body	9 mm.	8·5 mm.
Length of elytra	8 "	8 "
Length of pronotum ...	2·2 "	2·5 "
Width of pronotum ...	3·2 "	3 "

Hab.—Gippsland, Victoria. (Nat. Mus., Melbourne.)

I am not quite sure whether the two specimens represent the two sexes of the same species, but they are very similar. Type of *A. vestita*, Br., apparently.

*Apolyta bicolor, *sp. n.*

Male. Vertex of head and the disk of the pronotum pale testaceous. Abdomen, legs, and pectus black; also the antennæ.

Lateral and posterior margin of pronotum pale, pellucid. Elytra narrow, costal and basal part of radial area yellow, anal area (except small part of base) and the whole sutural margin black. Lateral margin of abdomen narrowly pale; cerci pale. Subgenital lamina elongate, apex truncate.

Length of body ...	...	...	...	7 mm.
Length of elytra	...	...	...	7·5 "
Length of pronotum	...	...	...	2.2 "
Width of pronotum	...	...	...	2·7 "

Hab.—Cape York, North Queensland. (S.A. Mus.)

This species belongs to the type of *A. pellucida.* The wings are pellucid, costal margin yellow, apex and anal area (partly) blackish. The specific name refers to the characteristic marking of the elytra.

*Thyrsocera (?) australis, *sp. n.*

Female. Blackish above, pale beneath, shining. Head black, concolorous. Pronotum subquadrangular, a little wider behind, angles rounded; margins (all round) white, widest laterally, very narrow behind; disk black; fore and hindmargins convex. Elytra gradually attenuated towards apex along sutural margin, black in reflected, brown by transmitted light, foremargin white, scutellum black. Legs and pectus pale. Base of coxæ and foremargin of femora black, spines of tibiæ brownish. Abdomen pale dirty grey, margin whitish, ventral segments black, margin broadly whitish and divided by a brown line. Supra-anal lamina truncate. Cerci long, lanceolate, flat, above pale, with a marginal row of dark dots; below banded black and white. Subgenital lamina large, rotundate, entire, laterally broadly white.

Length of body ...	...	...	...	9 mm.
Length of elytra	...	...	...	9 "
Length of pronotum	...	...	...	2 "
Width of pronotum	...	...	...	3 "

Hab.—North Queensland. (S.A. Mus.)

The genus has not been recorded hitherto from Australia (except by Walker, whose determinations are too indefinite for identification in most cases), but being widely distributed (India, America) its occurrence is not unexpected. The described specimen differs, however, from the typical species in having the middle vein scarcely angulated. The left elytron crosses the right at rest and covers the latter completely at the apex, the line of demarcations being deeply impressed and extending obliquely from near the base of the lower elytron to near the apex, indenting all the veins. This appears to me to be rather uncommon. The wings also seem to exhibit some differences; the border is

narrowly white in front, then much wider blackish, the large remainder translucent and smoky.

ISCHNOPTERA AUSTRALIS, *Sauss.* (?). No. 8.

The two specimens fit fairly well Saussure's description—"Pale ferruginous, antennæ brownish. Pronotum discoidal, narrower in front, hindmargin (sub-?) truncate, lateral margin pellucid, deflexed; disk opaque, with two slight (oblique) sulci. Elytra very long, narrow, margin reflexed, veins much raised, transverse veinlets perspicuous," with the following variations—Color pale tawny, disk of pronotum yellowish, pectus and legs greyish tawny, abdomen brownish. Supra-anal lamina of male triangular, apex deflexed, of female truncate. Subgenital lamina of male acute, of female rotundate. Cerci long, acute.

	Male.	Female.
Length of body	17 mm.	15·5 mm.
Length of elytra	22 "	18 "
Length of pronotum ...	4 "	4 "
Width of pronotum ...	6 "	6 "

Hab.— Dandenong, Victoria. (Nat. Mus., Melbourne).

The female has the left elytron aborted, it being less than half the length of the right, else quite perfect.

ISCHNOPTERA ANNULATA, mihi. No. 4.

Hab.—Melbourne, Victoria. Locality new. (Nat. Mus., Melbourne).

ISCHNOPTERA LONGIUSCULA (*Walk.*), *Tepp.* Trans. Roy. Soc. S. Aust., 1893, p. 51. No. 21 pars.

The male specimen before me agrees with Walker's description that I do not care to separate it (although larger), but append a description.

Pale tawny. Head brownish, eyes a little darker; antennæ pale brownish. Pronotum transversely oval, margins and median space pale, disk with dark spots and other markings. Elytra with ulnar vein much branched, rami directed obliquely towards hind margin; ulnar vein *recurved* at apex (in *Phyllodromia* directed forwards). Legs concolorous. Abdomen with dark margin. Subgenital lamina subtrigonal, apex subacuminate. Styles minute. Cerci dark brown.

Length of body...	12 mm.
Length of elytra	12 "
Length of pronotum	2·2 "
Width of pronotum	3 "

Hab.—Near Melbourne. Locality new. (Nat. Mus., Melb.).

Ischnoptera contraria, *Tepper*. No. 21 pars.

Hab.—Near Melbourne, Victoria. Locality new. (Nat. Museum, Melb.).

Ischnoptera brunneonigra, sp. n. No. 19.

Female. Brown above, almost wholly black beneath. Head black, vertex sometimes paler; antennæ brown, base black, first joint very large, first three joints shining, remainder dull, ciliate. Pronotum suborbicular, black, disk sometimes paler (reddish brown or varied with paler patches), margins narrowly pale. Elytra brown, anal vein recurved, narrow. Pectus, coxæ, and femora black or varied paler, tibiæ brown, tarsi brown or testaceous. Abdomen dark brown, margins broadly black. (Supra-anal lamina?) Cerci black. Subgenital lamina large, entire, hindmargin elliptic.

Length of body...	...	10·5 mm.
Length of elytra	...	12 "
Length of pronotum	...	3·2 "
Width of pronotum	...	4 "

Hab.—Fernshaw, Victoria. (Nat. Mus. Melb.).

The species is remarkable for its dark color. The egg-case of one is protruded to some extent, but incomplete.

*Ischnoptera, *sp. nov.*

Pale testaceous, head black. Pronotum brownish, with rather deep elongate and divergent impressions on each side of the raised midline extending close to the hindmargin; lateral margin and costæ of elytra pale, pellucid. Legs and underside tawny.

Length of body	...	8·5 mm.
Length of elytra	...	10 "
Length of pronotum	...	2 "
Width of pronotum	...	3 "

Hab.—Eucla, W. Australia (collected by Mr. Unbehaun, jun.). More material is desired before attaching a name.

EPILAMPRIDÆ.

Wodongia, *gen. n.*

Oblong, convex. Elytra *convex, shining, shorter than the wings*, apex broadly rounded; *principal veins almost obsolete;* costal and apical branches slightly raised; anal vein subsemicircular, impressed. Wings slightly exceeding the abdomen, anterior radial vein much and furcately branched towards the foremargin, posterior radial vein *with three parallel branches* behind, third only forked near apex; dividing vein unbranched, space between it and the anal vein unequal in width, veinless,

triangularly divided towards apex. Supra-anal lamina of female elongated, subtectiform, slightly tapering, apex truncate. Cerci slightly exceeding the lamina. Valvules acutely triangular.

The genus approximates *Paraphoraspis*, and may be placed before it, on account of the veins of the elytra not being so much obliterated. The insect differs in the venation of elytra and wings, also in their form and that of the anal appendages, from all others as far as known to me, and is easily recognisable by the promiscuous lunate spot of the pronotum and the peculiar shape and color of the elytra.

WODONGIA LUNATA, *sp. nov.* No. 30.

Female. Pale tawny. Head pale; a black band between the eyes; antennæ brownish at base, blackish beyond the middle, much longer than the body, filiform, ciliate. Pronotum smooth, shining, margin scarcely reflexed; disk with *a large lunate black spot* remote from foremargin, slightly indented in the middle anteriorly, sinuate behind, middle produced as an acuminate stripe to the hindmargin; latter subrotundate, narrowly bordered with brown in the middle. Elytra subcorneous, costal margin pale, widest at the base, thence gradually attenuated, not attaining the apex; discal area reddish brown, concolorous; anal vein impressed, curving regularly and meeting the hindmargin at right angles. Supra-anal lamina brown, margins and midline paler. Cerci lanceolate, acute, deplanate. Valvules and preceding segment brown.

Length of body	...	...	...	19 mm.
Length of elytra	...	...	...	13·5 "
Length of wings	...	...	...	15 "
Length of pronotum	...	...	...	5 "
Width of pronotum	...	...	...	8 "

Hab.—Wodonga, Victoria. (Nat. Mus., Melbourne.)

EPILAMPRA GRACILIS, *Brunner* (ZETOBORA GRANICOLLIS, *Sauss.*). No. 5.

Hab.—Near Melbourne, Victoria.

EPILAMPRA NOTABILIS, *Walk.* No. 43. Melbourne.

EPILAMPRA PROPRIA, *Walk.* No. 32. Victoria, mallee scrub, West District.

EPILAMPRA INQUINITA, *Stăl.* No. 28. Gippsland. New locality.

EPILAMPRA (RHICNODA, *Br.?*) PERPLEXA, *sp. n.* No. 34.

Male. Greyish tawny. Face with a brown longitudinal stripe, vertex (much wider than the basal joint of the antennæ) with three black lines. Pronotum transverse, anteriorly cucul-

late, lateral margin broad, reflexed; hindmargin depressed, sinuate, middle obtusangularly produced, disk *crowded with black, impressed dots.* Elytra flat, finely dotted, veins dark towards base; anal vein gradually and much recurved. Metatarsus externally with a few spinelets, internally crowdedly spinose; pulvilli small, apical. Abdomen much depressed, convex beneath, clouded blackish in the disk, laterally with dark dots. Subgenital lamina transverse, rhomboidal. Cerci pale, rather short, acute.

Length of body ...	...	...	26	mm.
Length of elytra	...	...	26	"
Length of pronotum	...	..	5	"
Width of pronotum	...	...	9·5	"

Hab.—Western districts of Victoria. (Nat. Mus., Melb.)

In general aspect the insect resembles very much Brunner's figure of his genus *Rhicnoda* (Rev. Orth., 1893, pl. i., fig. 11*b*), but is larger and the pronotum is crowdedly impressed punctate, a character otherwise attached to the American Phoraspinæ. From these it is, however, separated by all the remaining characteristics. Unlike the genuine *Epilampra*, the hindmargin of the pronotum is destitute of raised striæ. Until more material is available and the wingless (?) female discovered its place must remain uncertain.

GEOSCAPHEUSIDÆ.

Geoscapheus robustus, *Tepper*. No. 36. Murray River.

As pointed out by Mons. H. de Saussure (*in litteris*), these insects have most affinity with the Panesthidæ, and are removed to their vicinity.

PERIPLANETIDÆ.

*Polyzosteria viridicolor, *Tepper*, Trans. Roy. Soc., S.A., 1893, p. 73.

Hab.—Beltana. Locality new.

A female with egg-case attached and alive was received through Mr. T. Bee in February last. The egg-case is dark brown, nearly smooth, dull colored, and bean shaped, measuring 19 x 7 x 8 mm. The posterior part is suddenly cut off, the anterior end more acute. The crest is about 1 mm. in height, straight, and shows 27 small but distinct teeth, besides two or three merely indicated, the case containing therefore about 30 ova. This is the first case seen and described.

Polyzosteria oculata, *Tepper*, ibid, p. 75. No. 13.

Grampian Range, Victoria. Locality new.

Polyzosteria nobilis, *Brunner*. No. 31.

Hab.—Grampian Range, Victoria. Locality new. Also a specimen from Yorketown (legit Mr. A. Jung), which varies slightly in the legs of the male being mostly metallic bluish black, coxæ and underside pale yellow, banded metallic greenish blue.

Polyzosteria Frenchii, *Tepper*, ibid, 1894, p. 178. No. 12.

Hab.—Wodonga, Victoria. Locality new.

*Polyzosteria subreflexa, *sp. nov.*

Male. Resembling *P. reflexa*, Br., in form, but is smaller and *not scabrous*. Head dark greenish bronze, mouth parts pale; antennæ with first joint dark, second joint pale, remainder reddish brown. Pronotum broadly elliptical, lateral and foremargin subacutely reflexed, externally dusky yellow, upper edge reddish; disk not verrucose, with a flat, raised figure like an hourglass in the middle, and various excavations on each side, space near margin crowdedly impressed punctate, remainder with minute impressed dots, otherwise smooth and shining; hindmargin slightly concave, tuberculate, angles acutely produced. Meso- and metanotum similar, hindmargins smooth. Legs similar to those of *P. reflexa*. Abdomen concolorous, finely but indistinctly rugulose, lateral margins narrowly reflexed, rectangular, last two segments with angles produced; underside dark reddish piceous. Supra-anal lamina of male very short, transverse, hindmargin truncate, entire, narrowly and angularly deflexed. Cerci extremely short, yellow. Subgenital lamina trapezoidal, entire, hindmargin slightly convev, dark red. Styles as long or longer than cerci, red.

Length of body ...	...	22 mm.
Length of pronotum	...	7 "
Width of pronotum	...	11·5 "

Hab.—Ooldea. S.A. Museum (legit Prof. R. Tate).

The species is unlike any other, except *P. reflexa*, from which it is easily distinguished by its smooth surface and the totally different form of the anal lamina.

Platyzosteria melanaria, *Erichs.* No. 23.

Hab.—Western districts of Victoria. Locality new.

Platyzosteria atrata, *Erichson.* No. 39.

Hab.—Melbourne, Victoria. Locality new.

The specimen before me appears to agree perfectly with the short description published, except that the hind tibiæ are wholly red and the middle ones to about one-half, instead of only at the apex. The abdomen beneath is red in the middle, the supra-anal

lamina of the male rounded behind, and narrowly and angularly emarginate, the cerci broadly lanceolate, apex red; the subgenital lamina is short, truncate, and slightly emarginate, the styles rather long and acute. Length of body, 20 mm.; of pronotum, 5 mm. x 9 mm.

PLATYZOSTERIA BIFIDA, *Sauss.* No. 2, pars.

The female specimen received agrees so well with Mons. H. de Saussure's description of the male (Mel. Orth. II., p. 110; fig. 3) in all essential parts, that I have little doubt of the correctness of the mating, and append the supplementary description.

Female. Blackish chestnut, lateral margin of pro-, meso-, and metanotum dark red, disk smooth, shining, with very few minute impressed dots above and beneath. Head blackish, labrum and border of eyes red, ocellar spots and areoles of antennæ tawny; antennæ brown, base blackish. Pronotum with a slightly raised scutcheon-like figure in the disk with three rather prominent crenulations on each side anteriorly. Meso- and metanotum somewhat similar. Abdomen with hind margins of segments smooth, finely ciliate, angles acutely produced; underside similar, middle reddish. Coxæ black, external margins orange. Tarsi reddish to ferruginous. Supra-anal lamina subovate, emarginate, laterally serrate. Cerci short, apex pale. Subgenital valvules rather small, sutural part of apex incrassated.

Length of body	29 mm.
Length of pronotum	7 "
Width of pronotum	11 "

Hab.—Narre Warren, Victoria. Nat. Mus., Melb.

Walker's *P. tarsalis* appears to be somewhat similar, but is described as "sides minutely tuberculate, abdominal segments laterally tuberculate and segments 6 and 7 entirely so"—which is not the case in the above.

PLATYZOSTERIA EXASPERA, *Tepper*, l.c. 1894, p. 182. Nos. 2 (pars), 15.

Hab.—Near Melbourne (2), Berwick, Victoria. Locality new.

There were a pair from one place and a male from the other, the female with an egg-case attached. All agree well with the original types, notably in the sculpture of the surface, which affords a good criterion in allied forms.

*PLATYZOSTERIA COOLGARDIENSIS, *sp. n.*

Male. Resembling *P. latizona*, m., but larger and much broader in proportion. Yellow, banded with black, nearly smooth, moderately shining. Head testaceous, partly free. Pronotum yellow, shaded reddish laterally, with some raised black,

oblong spots around and adjoining the dark area; hindmargin rectangular, straight, angles slightly rounded. Meso- and metanotum similar, dark disk semicircular, hindmargins straight, angles slightly produced, subacute. Underside brownish tawny, lateral margin white. Coxæ brownish tawny, femora testaceous, tibiæ (except base) black, spines brown. Abdomen above narrowly banded black behind, shading into reddish medially, with some 2—4 minute black dots on each side near end of bands (behind) on segments 2—5; segments angular, 5—7 produced as a small spine; lateral and hindmargins beneath pale, last two segments with black disk. Supra-anal lamina transverse, very short, rounded, *middle deeply incised, the sutural angles produced as rather long, terete, acute spines*, base narrowly black, remainder pale yellow. Cerci nearly as long as the laminal spines, flat, black, apex dusky yellow. Subgenital lamina transverse, quadrangular, longer than the upper lamina, excepting the spines, black, hindmargin straight, entire. Styles inserted beneath the middle of the lateral margin, exceeding the hindmargin greatly.

Length of body	24 mm.
Length of pronotum	6 "
Width of pronotum	10 "

Hab.—Coolgardie, Western Australia. S.A. Museum; presented by Ch. French, F.L.S.

The somewhat defective specimen from the now famous Western goldfield is so distinct in its characters, that there is little hesitation in assigning its specific rank. Resembling *P. latizona* and *P. zebra* in color, it differs from them in size, texture of scutum, and the form of the anal lamina.

*Platyzosteria maculimarginata, *sp. n.*

Female. Dark brownish red. Head brownish red; antennæ, palpi, and labrum black, anterior margin of last pale. Pronotum semicircular, lateral margin scarcely reflexed, foremargin narrowly pale yellow; lateral margin and disk concolorous, with numerous remote impressed dots; hindmargin partly with a very narrow pale border. Meso- and metanotum similar, lateral and hindmargins black, latter very narrowly bordered pale. Pectus and coxæ black, latter bordered whitish; femora and tibiæ testaceous, tarsi black above, pale beneath. Abdomen above impressed rugulose, segments acutely rectangular, segment six alone with hindangles acutely produced; posterior half of each and the lateral margins wholly black; along the latter (except the sixth) in each segment a yellow spot, decreasing in size toward the apex (sometimes more or less obsolete), and more or less distinctly reproduced beneath. Supra-anal lamina transverse, sinuate, apex

rounded. Cerci? Subgenital lamina large, middle rotundately produced, laterally sinuate, valvules not free, but suture deeply and broadly impressed.

Length of body	...	...	20–22 mm.
Length of pronotum	...	...	6– 6·5 "
Width of pronotum	...	...	10–11 "

Hab.—Northern Queensland. S.A. Museum (presented by Ch. French, F.L.S.).

The species, of which two specimens are before me, appears to belong to the type of *P. trifasciata* and *picta*, m.; but is otherwise very different from any I know.

*Platyzosteria sp.

Male. Resembling *P. melanaria*. Coxæ black, bordered whitish behind; femora red. Supra-anal lamina subrotundate, margin entire or slightly emarginate. Subgenital lamina entire, with hindmargin straight, spines at the angles much shorter than the styles.

Hab.—Coolgardie, Western Australia (presented by C. French, F.L.S.).

Material insufficient for determination at present.

Periplaneta orientalis, *L.* No. 26.

Hab.—Frankston, Victoria.

Periplaneta Americana, *L.* No. 38.

Hab.—Fernshaw (?), Victoria.

Periplaneta provisionalis, *m.* (Trans. Roy. Soc., S.A., 1893, p. 108) (?). No. 45.

The species was previously described from the female alone, the above, I believe, is the male, although somewhat different, and resembles *Derocalymma* in outline.

Male. Reddish brown, scabrous, elongate, convex. Head partly free, testaceous; eyes widely apart, antennæ much shorter than the body. Pronotum elliptical, disk nearly smooth, lateral margin very narrow, scarcely deflexed, hindmargin straight, angles rounded. Meso- and metanotum angular, scabrous all over with minute raised tubercles; lobes of elytra not free, very narrow. Coxæ blackish, margins broadly tawny; femora testaceous; tibiæ brown, first tarsal joint blackish, remainder reddish yellow. Abdomen minutely scabrous, segments angular, the last two with hindangles spine-like produced, segment 7, very much rounded behind; underside red. Supra-anal lamina very narrow, elongate, triangular, apex cordately emarginate. Cerci

long, stout, blackish. Subgenital lamina transverse, very short, hindmargin rounded, entire. Styles black, rather long.

Length of body ...	...	...	...	15	mm.
Length of pronotum	...	...	...	4	"
Width of pronotum	...	...	...	5·5	"

Hab.—Torrens Creek, N.S. Wales *(Froggatt)*. Coll. Techn. Mus., Sydney; Fernshaw, Victoria. Localities new.

Periplaneta glabra, *Walk.* (*P. fortipes*, Walk. ?). No. 17. (*l.c.*, p. 107).

There being only a single female, the material is insufficient for certain determination. Color and texture agree very well, but the tarsi of the Victorian specimen are only half as long as those of the Northern Territory specimens, and less in size. I have also had two specimens from Mr. Froggatt, Sydney.

Hab.—Victoria; N.S. Wales. Localities new.

Periplaneta Jungii, *sp. n.*

Male. Resembling *P. picea*, Br. *Entirely deep shining black.* Pronotum elliptical, scarcely uneven, with a few remote, impressed dots; lateral margins scarcely reflexed, hindmargin straight, angles slightly rounded. Meso- and metanotum similar, lobes of elytra not free in adult. Abdomen smooth, segments rectangular, hindmargin with minute raised points, angles of two last segments produced acutely, lateral margins entire. Supra-anal lamina of male *deeply bilobed*, apex rounded, margin ciliate. Cerci flat, lanceolate, hirsute, more than twice as long as the lamina. Subgenital lamina transverse, short, hindmargin broadly and angularly indented (like "M"). Styles as long as the supra-anal lamina, and situated on the exterior angles of the subgenital.

Length of body ...	...	...	...	15	mm.
Length of pronotum	...	...	...	5	"
Width of pronotum	...	...	...	9	"

Hab.—Yorketown, Yorke's Peninsula.

The species is easily distinguished by the body and limbs being of a uniform deep black, and the peculiar form of the supra-anal lamina. It is named after my friend and schoolmate, Mr. Aug. Jung, who from boyhood's days associated assiduously with me and others in collecting and observing insect life, and who furnished the specimens described above.

Periplaneta parva, *sp. n.*

Female. Body convex, apterous, black, shining. Head concealed, black; labrum red, palpi dark brown, antennæ brown, with

from *one to three whitish joints* at about two thirds of the length from the base, densely ciliate. Pronotum semicircular, rectangular behind, disk smooth, hindmargin straight. Meso- and metanotum similar, hindangles slightly produced. Legs brown, trochanters and tarsi yellowish red. Abdomen smooth, segments mostly rectangular. Supra-anal lamina elongate triangular, tectiform, apex slightly emarginate. Cerci broad, not much exceeding the lamina, black. Subgenital valvules small, acute.

Length of body	12 mm.
Length of pronotum	3 "
Width of pronotum	5 "

Hab.—Sydney, N.S. Wales (Techn. Mus., Sydney, No. 4).

There are two females, to one of which a mature egg-capsule was attached on receipt. The latter is dull brownish red, with 13 distinct equilateral triangular teeth and 6 mm. in length. The species is the smallest known to me, and on account of the shortness of the cerci exhibits some affinity to Platyzosteria.

Periplaneta sp.

Male nymph. Testaceous, banded black, legs tawny. Abdomen thinly ciliate. Supra-anal lamina very transverse, broad, hindmargin produced, bilobate. Cerci large, thickly hirsute. Subgenital lamina very short, transverse, hindmargin rounded, entire. Styles marginal, longer than lamina.

Length of body	17 mm.
Length of pronotum	5 "
Width of pronotum	6 "

Hab.—New Hebrides (legit Rev. A. Gray).

Material not sufficient for identification.

Drymaplaneta submarginata, *Tepper*, *l.c.*, 1893, p. 111.

Male nymph.

Hab.—Eucla, W. Australia (legit Mr. Unbehauns, jun.). Locality new.

Genus Temnelytra, mihi.

As the females of the species included in this genus possess subgenital valvules the genus is removed from the Phyllodromidæ, where first placed on account of general aspect, to the Periplanetidæ, as a subgenus of *Periplaneta*.

Temnelytra Harpuri, *Tepper*, *l.c.*, 1893, p. 39. No. 6.

Hab.—Gippsland.

A single female in no respect differing from the type.

TEMNELYTRA SUBTRUNCATA, *sp. n.* No. 9.

Dark red to black. Head concealed, red; ocellar spots, base of antennæ, and *labrum pale tawny;* antennæ longer than the body, testaceous to brownish. Pronotum parabolic, convex, shining, *lateral margins broadly pale tawny*, disk reddish brown, shading into black, medial stripe more or less distinct, testaceous; hindmargin nearly straight. Elytra obliquely truncate towards sutural margin, in female extending to the metanotum, in the male to the second abdominal segment; lateral margin broadly pale tawny; sutural margins applied, narrowly testaceous. Scutellum rather large. Wings lobiform, apex exposed in male, lateral margin tawny; in the female wholly concealed and rudimentary. Metanotum of female and second abdominal segment of both sexes narrowly pale bordered. Abdomen shining, segments concolorous or hindmargins narrowly testaceous, angles acutely produced. Supra-anal lamina of male short, transverse, quadrangular, disk deeply depressed; of female trigonal, carinate, apex emarginate. Cerci of male lanceolate, flat, brown, more than twice as long as lamina; of female scarcely as long as lamina, else similar. Subgenital lamina of male nearly quadrate, convex; styles nearly as long, red; valvules of female normal.

	Male.	Female.
Length of body	16 mm.	18 mm.
Length of elytra	4·5 "	3·8 "
Length of pronotum	4·3 "	5 "
Width of pronotum	6 "	7 "

Hab.—Fernshaw, Victoria, (Nat. Mus., Melbourne.)

This species apparently resembles *Platyzosteria truncata*, Br., but differs in the abdomen not being pale bordered. Of the latter species only the female has been described, the elytra of which are less abnormal in form than those of the male; it should probably be removed from the genus in which it is placed and united with *Temnelytra* on that account.

The legs of *T. subtruncata* are testaceous, but the coxa blackish, bordered with pale tawny, and the tarsi paler. The abdomen beneath is deep shining black and concolorous.

TEMNELYTRA ABBREVIATA, *sp. n.* No. 20.

Female. Resembles *Stylopyga*. Pale testaceous, concolorous. Pronotum transverse, hindmargin slightly concave. Elytra rather pale, lateral margin rotundate (angles rounded), extending to first abdominal segment; sutural margin nearly straight, much shorter; apical border concave, slightly oblique, inner angle almost square and slightly rounded. Legs and underside rather pale. Supra-anal lamina broadly trigonal, apex rotundately

emarginate. Subgenital lamina transverse, hindmargin straight. Cerci normal.

Length of body	...	...	...	11·5 mm.
Length of elytra	...	...	...	3·3 "
Length of pronotum	...	...	...	3·2 "
Width of pronotum	...	...	...	5 "

This species differs from all other known to me by the short, square form of the elytra with obliquely concave apical margin.

Hab.—Narre Warren, Victoria. Nat. Mus., Melbourne.

CHORISONEURIDÆ.

Choristima, *gen. n.*

Resembling *Chorisoneura*, but the elytra more or less abbreviate, and the veins very indistinct, the longitudinal being distinctly separated (not united as in *Ectobia*).

Removed from *Chorisoneura* on account of the above differences.

Choristima hydrophoroides, *Walker*, and Ch. Loftyensis, *m.*

Transferred from *Chorisoneura* (*l.c.*, 1893, p. 114).

Choristima Kershawi, *sp. n.* Nos. 3, 41.

Testaceous. Head with a black band between the eyes, sometimes more or less obsolete; antennæ reddish. Pronotum transversely oval, wider behind, lateral margin broad, reflexed; disk with two broad, transverse, black bars, sometimes almost confluent, hindmargin and angles narrowly whitish. Elytra testaceous, medial stripe black, extending from anal vein to apex, latter rotundate. Wings shorter than elytra. Pectus and legs red. Abdomen above black, indistinctly varied with red, so as to form two stripes near the middle; segments beneath with hindmargins reddish. Supra-anal lamina transverse, red, of male middle rotundately produced, of female truncate, broadly emarginate, hindmargin deflexed. Cerci long, slender, red. Subgenital lamina cucullate, hindmargin of male subtruncate, of female triangularly produced, acute.

	Male.	Female.	Nymph.
Length of body ...	8 mm.	9·5 mm.	6·5 mm.
Length of elytra ...	5 "	5 "	—
Length of pronotum...	1·8 "	2 "	1·4 "
Width of pronotum ...	3·2 "	3·5 "	2·5 "

Hab.—Near Melbourne; Bunyip, Victoria. Nat. Mus., Melb.

The species (or variety?) differs from both the others in being considerably larger, and from *C. Loftiensis* in the transverse bars of the pronotum being very much wider, and deep black instead of brownish.

PANCHLORIDÆ.

ONISCOSOMA CASTANEA, *Br.* (ZETOBORA ANTICA, *Walk.*). No. 35.

Hab.—Melbourne.

PANESTHIDÆ.

PANESTHIA AUSTRALIS, *Brunner.* No. 1.

Hab.—Mordialloc, Victoria. Two males. Locality new (Nat. Mus., Melb.).

The specimens agree perfectly with the original description. The males, however, appear to have the elytra and wings perfectly developed, whilst the females, as already recorded, have them irregularly abbreviated.

The Comparative Anatomy of the Cerebrum of Notoryctes typhlops.

By G. Elliot Smith, M.D., Ch. M., Demonstrator of Anatomy, University of Sydney, N.S.W.

[Read September 3, 1895.]

Hitherto no attempt has been made to describe any part of the central nervous system of *Notoryctes*, for the simple reason that no suitable material has been available for examination. In the earlier specimens of this interesting marsupial, Dr. E. C. Stirling found (38) that the condition of the brain was such as "to render an examination quite hopeless;" and though the later specimens were received in better condition, they have been used for other purposes, rather than destroy much of the skeletal and muscular systems, with a doubtful prospect of getting any useful material as compensation.

Although I have only been able to obtain the cerebrum, and that not in a perfect state of preservation, I propose, in view of the great interest attaching to this remarkable mammal, to present to this Society the imperfect results of the examination of that part of the brain. This account is naturally, from the nature of the material, very incomplete and patchy, and is published in this unsatisfactory form, since the prospect of getting any better material is very doubtful.

For the opportunity of examining this interesting specimen, I must express my deepest gratitude to Professor Wilson, who very kindly allowed me to remove the brain from one of the specimens, which he had received from Dr. Stirling for the purpose of investigating the myology. To Professor Wilson I am also deeply indebted for much of the valuable material which has been used for comparative purposes in this investigation, as well as for directing my attention to a number of papers, referred to in this account, which I would otherwise have overlooked.

As Professor Wilson had not completed the examination of the muscles of the head and neck, I was only permitted to remove that small area of the cranial roof lying between the temporal muscles in front of the superior nuchal crest. Although the task of removing an imperfectly preserved brain through such a small gap did not appear very hopeful, yet by removing the brain in segments (a course which I was reluctantly compelled to adopt) I was enabled to obtain the cerebrum without much disturbance of its parts. A relatively thick dura mater is exposed

on removing the thin cranial roof. In it there is situated a large superior longitudinal sinus, which opens on either side posteriorly into a lateral sinus lying between the cerebellum and cerebrum Whether this lateral sinus is drained mainly through the "mastoid" foramen, as in *Perameles*, or through the jugular foramen, as in most mammals, I was unable to determine. On removing the dura mater the cerebrum is exposed, as well as the relatively enormous olfactory bulb placed directly in front of each hemisphere. Posteriorly a narrow triangular gap is left between the two cerebral hemispheres and the cerebellum. When the dura mater is removed from this interval a crucial sulcus will be observed upon the dorsal aspect of the mesencephalon in its depths, corresponding to the divisions between the corpora quadrigemina. A similar appearance is to be found in *Perameles*. The interval is not so marked in other Marsupials, and in some, such as *Petaurus*, very little, if anything, of the mesencephalon can be seen until the cerebral hemispheres are divaricated. Laterally in *Notoryctes* each cerebral hemisphere only just touches the anterior border of the cerebellum. This, coupled with the fact that there is a very slight divergence of the hemispheres posteriorly, leaves the corpora quadrigemina partly exposed. In all Marsupials the mesencephalon can be seen to a very slight extent when the dura mater is removed from the brain in situ, and in *Notorcytes* and *Perameles* this exposure of the corpora quadrigemina is more marked than in others. This is opposed to the opinion of Sir William Turner, who says (40) that in all Marsupials, as in Edentata, Insectivora, Cheiroptera, and Rodentia, the mesencephalon is quite hidden by the cerebrum. Forbes (12) in *Phascolarctos*, and Beddard (1) in *Thylacinus*, admit that the corpora quadrigemina are partially exposed.

The roof of the cranium is so thin and translucent that, without removing it, the dorsal aspect of the cerebrum may be seen. Thus in Dr. Stirling's (38), figure 1, plate vii., the roof of the cranium is seen to be mapped out into four areas by a dark cross, which corresponds to a well-marked thickening of the bone internally along these lines. The transverse marking corresponds to the line of separation of the olfactory bulbs from the cerebral hemispheres. It will be noticed that, as a result of the large relative size of the bulbs, this line is placed very far back—opposite the mid-point of the zygomatic arch.

To remove the brain, the olfactory peduncles were first incised, and the lobes were then readily raised and removed. The mesencephalon was then divided, and the cerebrum easily wedged out of the cranium. In this process the infundibular region of the floor of the third ventricle was, unfortunately, damaged, so that it was impossible to determine whether any trace of optic

nerves was present. After removing the almost vertical tentorium cerebelli, the rest of the brain was picked out piecemeal. The cerebellum exhibited an extreme degree of simplicity, such as is found only in *Perameles* to my knowledge among Mammals. With the exception of these two genera, every other Marsupial with which I am acquainted has a well convoluted cerebellum, with a distinct vermis, from which the lateral mass on either side is separated by a deep sulcus, in which there is a white (medullated) nerve tract. In *Perameles*, however, the cerebellum consists of a curved folium, which forms an operculum, covering up a few rudimentary folia near the mesencephalon. The superior and posterior surfaces of this folium are almost quite smooth, only the faintest trace of two or sometimes three sulci being seen. The only indication of a division into vermis and lateral masses is the presence of two shallow furrows, but there is no medullary band. In *Notoryctes* the cerebellum is in many respects like that of *Perameles*. It appears to consist of a thin vertical slab of grey matter, which fills up the narrow interval between the posterior surface of the cerebrum and the occipital plane of the skull. Between the base of this rudimentary folium and the mesencephalon there appear to be several rudimentary folia. In striking contrast to the simplicity of the cerebellum proper, there is a large, projecting, trilobular flocculus, both in *Notoryctes* and *Perameles*, lodged in a deep floccular fossa, which extends outwards in the petrous part of the periotic almost to the surface of the skull. It will be noticed in the Marsupial series that the cerebellum proper increases in size and complexity (in the number and arrangement of folia) the larger the size of the "pallium" (using that term in Turner's sense [42]). In *Notoryctes*, where the "pallium" is extremely small, there is a corresponding simplicity of the cerebellum.

Concerning the rest of the brain (excepting of course the cerebrum) nothing can be said, since the imperfect preservation and the injuries inflicted during extraction forbid a proper examination. The remainder of this account will therefore deal solely with the cerebrum.

After examining the superficial aspect of the brain a median sagittal section was made and one hemisphere dissected. The other hemisphere was then stained with an aqueous solution of anilin blue-black and imbedded in paraffin. The block was then cut in a series of coronal sections. Considering the state of the material little was expected in the way of staining. The result, however, far exceeded my expectations, for a considerable amount of histological detail was exhibited, so that in some sections the cells of the fascia dentata and cornu Ammonis could be clearly distinguished. For this satisfactory result I am deeply

indebted to Mr. Robert Grant for his valuable assistance in staining.

Although it is interesting and instructive to compare the relative development of the various parts of the cerebrum with the corresponding regions in the brains of Edentata and Insectivora which functionally resemble *Notoryctes*, yet in its general plan of architecture the cerebrum of the latter is so essentially Metatherian that it will prove much more instructive and valuable to compare it with other Marsupials. Though the brain of *Notoryctes* may superficially present a much stronger resemblance to those of *Talpa* and *Dasypus*, yet its general morphological plan is identical with the apparently very dissimilar *Macropus* and *Thylacinus*. In these comparisons with non-placental Mammals I shall be compelled to rely almost wholly upon my own observations, in all cases made upon fresh material. So much has been written upon the Marsupial and Monotreme brain by European workers, whose descriptions—generally of bad material—have been too clearly dominated by preconceived notions of structures which one would expect to be present, or which previous writers had described, that the value of their accounts is largely discounted. As a result, many of the most fundamental points which can be appreciated at a glance in fresh material are still matters of dispute.

I very much regret that I have been unable to consult Leche's account of the brain of *Myrmecobius fasciatus* (16).*

My knowledge of the Edentate, Insectivore, and Rodent brain I owe largely to the writings of Owen (29), Hyrtl (22), Ganser (13), Rabl-Rückhard (30), Flower (11), and Turner (41, 42).

While the cerebrum of the different members of most Orders present features in common, distinguishing them from other Orders, it must be remembered that the different members of a given Order present variations in form and development which have little value for classification, being largely the expression of functional differences. Since the cerebrum is so largely modified by the habits and mode of life of the individual, too much weight must not be attached to mere resemblance between the brains of different genera. Thus the many points of striking resemblance between the cerebrum in *Notoryctes* and *Perameles* do not necessarily imply an affinity between the two genera, but merely a functional resemblance.

The Marsupial brains, which I have examined, include those of *Perameles nasuta*, *Dasyurus viverrinus*, *Phascolarctos cinereus*,

---

* Since this account was written, Professor Leche has forwarded me a copy of his paper. Speaking of the cerebrum he merely states that its general features accord with Sir Richard Owen's account of the marsupial cerebrum (29).

Petaurus breviceps, *Phalangista vulpina*, various species of *Macropus* and *Potoroo*, as well as a number of fœtal specimens of these genera.

General Account of the Cerebrum.

The cerebrum of *Notoryctes* presents an extreme simplicity of structure, and relatively a diminutive size for a Mammal. It is the lowliest Marsupial brain that I have examined, and compared with the size of its olfactory bulb, it is relatively smaller than that of any other Mammal with which I am acquainted. Although its "pallial" development is far below that of both Monotremes, it exhibits features in its general plan of construction which must be regarded as superior to the Prototherian condition. Thus it exhibits a greater degree of bending than either Monotreme.* It possesses a much more compact internal capsule than *Ornithorhynchus*, in spite of the smaller "pallium."

Together with the olfactory bulb, each hemisphere has a roughly pyramidal form, with a base, which is almost vertical, directed backwards. Its superior surface presents a gradual incline backwards and upwards, whose slope may be readily appreciated from Dr. Stirling's profile view of the skull (fig. 1, pl. vi.). The maximum length is about 13 mm., of which, roughly speaking, the anterior one-third is olfactory bulb and the posterior two-thirds cerebrum (figs. 1 *et* 3). The maximum breadth of the hemisphere—near the posterior border—is 6·5 mm.; and, as may be seen from the shape of the skull, and from fig. 2, it rapidly tapers as it is traced forwards, the somewhat heart-shaped olfactory bulb forming its apex. The posterior part of the olfactory bulb is slightly wider than the anterior extremity of the hemisphere, a fact which can be readily appreciated from the shape of the cranium in Dr. Stirling's fig. 1, pl. vii. The maximum depth of the hemisphere is 10 mm.

The Olfactory Bulb.

The *bulbus olfactorius* is a large grey mass placed directly in front of, and not overlapped by, the hemisphere. It is lodged in a special compartment of the cranium, whose anterior and lateral walls, as well as the broad flat floor, are perforated by a large number of foramina. The cribiform floor of this "rhinencephalic" part (Owen) is separated from the rest of the cranial floor by a transverse bony ridge, which becomes more prominent as it is traced on to the lateral walls of the cranium. The continuation of this bony thickening in the roof forms the dark transverse line, already referred to, in fig. 1, plate vii., of Dr. Stirling's paper.

---

* See supplementary note, p. 193.

The mesial surfaces of the olfactory bulbs (fig. 3, *olf. b.*) are flat and separated from one another merely by the falx cerebri. There does not appear to be any depression upon the mesial aspect of the olfactory bulb such as is found in *Perameles*, and which has been distinguished in *Didelphis* as the "mesal olfactory fossa" by Herrick (17). The inferior surface of the bulb is flat and rough from the insertion of olfactory nerves. Posteriorly it is separated from the base of the brain by a deep curved sulcus (fig. 2). The lateral aspect is rough and convex, in accordance with the shape of the cranium, and is separated from the cerebrum proper by a well-marked furrow, in which the external olfactory radiation (fig. 1, *e.o.r.*) appears to arise.

On all aspects, therefore, the olfactory bulb is separated from the hemisphere proper by a deep constriction, in the depths of which the prosencephalic part of the bulb is continuous with the hemisphere. This constricted neck of tissue will be distinguished as the *olfactory peduncle.*

The olfactory bulbs stained remarkably well with anilin blue black, and their structure was clearly demonstrated. There is a large olfactory ventricle continuous posteriorly (as in all Monotremes and Marsupials and most lowly Mammals) with the anterior horn of the lateral ventricle. The wall of the ventricle is arranged (fig. 11) in four well-marked zones—(1) a thick peripheral zone of non-medullated olfactory nerve fibres and glomeruli, (2) a clear zone containing numerous mitral cells, (3) a layer containing numerous radiating and concentric nerve fibres, and (4) a layer containing a dense mass of medullated nerve fibres, directly continuous externally with the external olfactory root, and internally with the internal olfactory root. The olfactory peduncle extends into the olfactory lobe immediately surrounding the ventricle, and forms a large mass on the other side of the olfactory ventricle, lying internal to the fourth layer described above. In the substance of this part of the peduncle the large *pars olfactoria* of the anterior commissure extends forwards (fig. 11, *p.o.*). Its fibres enter the fourth layer described above, and cannot be further traced, as they are so intimately mixed with the fibres of the olfactory radiations. There is nothing else of note to describe in the histology of this region in *Notoryctes*, as it agrees in all points with the fuller description given elsewhere (37).

The Cerebrum Proper.

In describing the cerebral hemisphere, it will be convenient to consider it under three headings—(1) the cranial or lateral, (2) the basal or ventral, and (3) the mesial aspect.

The Lateral Aspect.

The cranial surface of the cerebrum (fig. 2) appears to be quite smooth, if one excepts a shallow furrow, which, starting in front in the sulcus between the hemisphere and bulb, arches backwards and downwards to reach the ventro-lateral border of the hemisphere at about its mid-point. This groove contains the *external olfactory radiation* of Edinger—the *external olfactory root* of most writers (fig. 1 *e.o.r.*). This radiation consists of a somewhat sickle-shaped band, of a pure white color, and in *Notoryctes* is relatively very broad in front, but it rapidly tapers as it is traced backwards. An analagous arrangement of this tract is found in all Marsupials, and most lowly Eutheria, but in the Monotremes it does not form a compact strand, as in the Marsupials, but a diffuse fibre system scattered uniformly over the pyriform lobe. The depression in which it lies in Marsupials is the *fissura radicis* of Herrick (17) or *endorhinal fissure* of Turner (42). In the case of *Notoryctes* and *Perameles*, where the radiation is broad, the fissura endorhinalis should properly be placed at the ventral or concave border of the strand, since the latter really rests upon the pyriform lobe, of which the endorhinal fissure is considered the ventral limit. Apart from this slight depression, corresponding to the fibre tract, the lateral surface of the hemisphere appears perfectly smooth and free from fissures. There does not appear to be any trace of a *rhinal (ectorhinal) fissure.* It is just possible that in a perfectly fresh specimen such a fissure may be discernible, but, arguing from comparative data, one should expect it to be very indistinct and shallow, if present at all. The rhinal fissure forms the dorsal boundary of the pyriform lobe, and therefore is reckoned as a "fundamental fissure" (Turner), since it separates the pyriform from the "*pallium*" (in the restricted sense used by Turner), which lies above it. The position of the fissure upon the brain surface will depend therefore upon the relative sizes of pallium and pyriform. Thus in many Marsupials, such as *Dasyurus*, *Phalangista*, *Petaurus* and *Phascolarctos*, and in many Eutheria, such as the rabbit, it consists of a well-marked fissure on the lateral aspect, near the base of the brain. As the relative size of pallium to pyriform increases, as in *Hypsiprymnus*, *Petrogale*, *Echidna*, *Macropus*, *Ornithorhynchus*, and most placental Mammals, the fissure comes to be placed nearer the base, or even to lie entirely upon the basal or mesial aspects of the cerebrum. As, however, the proportion of pallium to pyriform decreases the position of the fissure on the lateral wall rises; in other words, the pyriform lobe takes an increasing share in the formation of the lateral part of the hemisphere. Thus in *Dasypus* (Turner, 41), *Talpa* (Ganser, 13), *Didelphis* (Herrick, 17) it is greater than in *Dasyurus.* In *Erinaceus* the

fissure is higher than in *Talpa*. In *Perameles nasuta* it is higher on the cranial aspect than in *Didelphis* or *Erinaceus;* and the pyriform lobe takes a greater share in the formation of the lateral hemisphere wall than in any other Mammalian cerebrum with whose description I am acquainted. Now, the size of the pyriform lobe varies directly with that of the olfactory bulb. In *Notoryctes* the proportion of cerebrum to olfactory is smaller even than in *Perameles*. The natural conclusion to draw is that in *Notoryctes* the proportion of pallium to pyriform is smaller than in *Perameles*, *i.e.*, that the situation of the rhinal fissure (if such a fissure were present) would be still higher up on the lateral aspect than it is in the Bandicoot's cerebrum. This opinion is borne out by histological examination.

It is to be noted that the constancy, depth, and distinctness of this fissure are apt to become less marked in animals with a small pallium. This has been pointed out in a number of Rodentia and Cheiroptera by Turner (42), in *Dasypus gymnurus* by Hyrtl (22), and is also to be noted in *Perameles nasuta*. In animals with a slightly higher pallial development, however, it becomes deeper and better marked, and is more constant. The size of the pyriform lobe is fixed by that of the olfactory bulb. The size of the pallium, however, is a very variable quantity, and does not present any relation to the development of any sense organ. It is a higher "level" of nerve-matter built upon the lower, rhinencephalic part, but independent of the latter as far as its proportions are concerned. When in the lowly Mammal a "pallium" first appears it probably, as in *Notoryctes*, forms merely a small dorsal cap lying on the pyriform lobe, and not separated from it by any fissure. The size of the pyriform is already determined, and therefore fixed, but the pallium continues to increase to a variable extent in different Mammals. As it increases *(Perameles, Didelphis)* the pallium tends to bulge over the fixed pyriform, producing a rhinal fissure. As this tendency becomes greater *(Phascolarctos, Dasyurus, Petaurus, Phalangista)* the fissure becomes deeper and much more definite, so that in all the higher forms it remains as a deep and well-marked sulcus. With its increased growth the pallium overlaps the pyriform, which thus comes to lie upon the basal or median aspect of the hemisphere, as in *Ornithorhynchus*, with its small pyriform and large pallium *(vide* 36, fig. 1). The appearance of the rhinal fissure and the constancy of the pyriform lobe can thus be explained on developmental and comparative grounds, without resorting to groundless and far-fetched hypotheses, such as those of Hill (19). The pyriform lobe is practically smooth in all Mammals, because its size is determined by the relative size of the olfactory bulb, and its form fixed before the pallium becomes convoluted. In

other words, it reaches its height of development early in entogeny as in phylogeny, and has almost ceased growing, at a time when the continued active growth of the pallium becomes manifest by the production of gyri and sulci. Hence the pyriform always is and remains smooth.* Behind the external olfactory radiation the pyriform lobe is prolonged downwards to form a marked protuberance at the postero-inferior part of the hemisphere. This is the *natiform eminence* (fig. 1, *n.e.*) To this posterior part of the pyriform lobe, which is often called the *lobus hippocampi*, the term pyriform is often restricted (Turner 42), the anterior part of the lobe proper being considered part of the olfactory peduncle. An examination of the cerebrum of Platypus shows at a glance the inconsistency of this distinction. In *Ornithorhynchus* the pyriform lobe forms a uniform band extending from the sulcus between bulb and hemisphere in front to the extremity of the latter behind, and throughout exhibits uniformly the characteristic features of the lobe, as described in the rabbit by Koelliker (15). The natiform eminence is largely the expression of the bending, which takes place in the posterior pole of the hemisphere in Mammals.

In Platypus, where the bending is slight, there is therefore no natiform eminence. In other Mammals, when the bending takes place, the pyriform, which occupies the concavity of the bend, tends to be crowded into a smaller space, and to overcome this tendency bulges posteriorly. This is all the more marked, since in all animals the pyriform (like the cerebrum itself) is larger and deeper posteriorly, in conformity with the shape of the skull. Another evidence of this bending is seen in the *vallecula Sylvii*, which Turner considers as the anterior limit of the pyriform lobe. It is probably merely the result of the bending.

The term *hippocampal*, which is often applied to this region, is very unfortunate, and the cause of considerable confusion. The close relation of the pyriform to the hippocampus in Eutheria is largely fortuitous and not essential. In Marsupials in the greater part of its extent the subiculum cornu Ammonis does not form part of the gyrus hippocampi or of the pyriform lobe, this relation only obtaining at the posterior extremity (descending horn) of the hemisphere. In placental Mammals this is the only part of the hippocampus which survives the revolution in cerebral structure, which the appearance of a corpus callosum creates; and hence there is a close topographical relation between the whole of the hippocampus and the posterior part of the pyriform. But the pyriform lobe, *lobus hippocampi*, and *gyrus hippocampi* have

---

* In certain animals, such as *Echidna* and the pig, the surface of the pyriform lobe may become wrinkled.

no essential relation to the hippocampus, so that it would be wise to discard the use of the term hippocampal, as applied to the pyriform lobe, altogether. As examples of the confusion which such a nomenclature causes one might cite the examples of Herrick and Bawden speaking of the hippocampus, when from the context they evidently mean the pyriform, and Beddard (1) calling the rhinal fissure hippocampal.

On the lateral aspect of the hemisphere there will be noticed below the external olfactory radiation a large hemispherical mass (fig. 1, *t.o.)* of a pale-grey color and almost as large as the natiform eminence. This is the *tuberculum olfactorium.* It will be more satisfactory if its description be deferred until the base of the brain is being described. The whole surface of the pyriform lobe and tuberculum olfactorium is pale, from the fact that they both receive a medullary coating in the form of arching white fibres from the external olfactory radiation. [The direction of these fibres is indicated in fig. 2 by a number of curved lines on the right side of the figure.] In all the brains which I have examined these fibres extend as high as the rhinal fissure, so that in a fresh brain of *Notoryctes* almost the whole lateral aspect of the hemisphere would be white, as it is in *Perameles.* In all the Marsupial and Monotreme cerebra which I have examined histologically these radiating white fibres terminate both by means of naked end branchings and collaterals in relation to the pyramidal cells of the region. These cells, in addition to their large peripheral protoplasmic processes, are provided with large basal processes, and hence have been distinguished in the rabbit's brain as "Doppelpyramiden" by Koelliker (15). The fibres spreading out over the tuberculum olfactorium terminate in a similar manner in relation to the small multipolar cells of the region.

The Basal Surface.

The inferior aspect of the cerebrum is very irregular, and slopes downwards and backwards from the olfactory bulb to the natiform eminence. Immediately behind the olfactory bulb, there may be seen on either side of the middle line the huge protuberance forming the tuberculum olfactorium (fig. 2, *t.o.*). Bounding this laterally and posteriorly will be seen the crescentic external olfactory radiation (fig. 2, *e.o.r.*), which rapidly tapers as it is traced backwards and inwards to end in a little tubercle of grey matter (fig. 2, *), which is placed over the anterior extremity of the nucleus amygdalæ. Behind the tuberculum olfactorium is the more laterally placed eminentia natiformis (fig. 2, *pyr. l.*). As in *Perameles* and *Erinaceus*, all that can be seen of the base of the cerebrum belongs to the "rhinencephalon' of Turner (42). In animals a little higher in the scale of pallia

development (such as *Dasyurus*, *Petaurus*, *Phalangista*) the rhinal fissure, and therefore part of the "pallium" would be seen in a basal view of the brain. In Platypus, with its small pyriform and large pallium, the rhinal fissure is quite near the middle line of the base.

The huge size of the tuberculum olfactorium gives quite a characteristic appearance to the base of the brains of *Notoryctes* and *Perameles*. Ganser says (13) that in the mole this part of the brain, which he calls "*Rinde am Kopf des Streifenhügels*," is larger than in any other animal with whose cerebrum he is acquainted. In *Perameles*, however, it is much bigger, and more prominent than it would seem to be in *Talpa* (Ganser), *Dasypus* (Turner), *Erinaceus*, or *Chlamydophorus* (Hyrtl), all highly macrosmatic animals. In *Notoryctes* it reaches a still higher development, forming a hemispherical mass, which is almost as large as the eminentia natiformis. In the macrosmatic *Hypsiprymnus* and *Dasyurus*, although it is large and prominent, it appears small and flat when compared with the same region in *Notoryctes*. In *Phalangista* and *Petaurus* it is almost quite flat, corresponding to the lesser development of the olfactory organ. In such it can readily be homologised with Broca's (5) *espace quadrilatére* or *middle (grey) olfactory root*. In *Macropus* and *Petrogale*, although it is large, it is not prominent, owing to the large size of the rest of the brain. In *Ornithorhynchus* it forms a small elliptical swelling. In *Talpa*, and apparently also in *Chlamydophorus*, according to Hyrtl's notes, it would appear to be little, if anything, larger than in *Dasyurus*. This will give some idea as to its immense size in *Notoryctes*. Superficially it is covered by a medullary coat from the external olfactory radiation. In addition to the names already applied to this mass above, it has been distinguished in *Didelphis* and Sauropsida as the "*post-rhinal lobe*" by Herrick (17). It corresponds to the "*orbital lobe*" of Turner in *Dasypus sexcinctus* (41), and possibly to Burckhardt's "*lobus post-olfactorius*" in *Protopterus annectans*. In man its homologue is probably found in the atrophic grey matter found in the *locus perforatus anticus* of Vicq d'Azyr.* It is intimately connected with the olfactory bulb, and varies in size with that organ. It is therefore ridiculous to exclude it from the rhinencephalon as Hill has done (19) in the case of *Ornithorhynchus*.

This peculiar development of the base of the brain has a

---

* In all Marsupials and Monotremes there is a small flat area behind the *tuberculum olfactorium*, which corresponds to what Burt Wilder calls the "portio depressa" in the cat. This is the true homologue of the *locus perforatus*. In man, where the tuberculum atrophies and no longer forms a prominence, the term is vaguely used for the whole region.

marked influence upon the conformation of the basis cranii. As no attempt has been made to describe this part of the skull in *Notoryctes*, it may be of interest to add brief notes of what could be made out in a "wet" specimen.

A comparison of the brain and cranium in the Proto- and Meta-theria affords a number of instances of the mutual moulding influence of these two parts upon one another. Thus in *Echidna* the cranial cavity is very short—possibly for phlyogenetic or functional reasons—and offers a restraining influence upon the pallium as it tends to increase in the sagittal direction. As a consequence the pallium becomes convoluted mainly in a transverse direction, so that, with the bending of the hemisphere, its fissures have a radiating arrangement. In the higher Metatheria the elongated form of the cranium allows a greater sagittal extension of the cerebrum, so that the transverse or radiating folding of *Echidna* is not found in Marsupials; but in all the higher forms there is a long narrow, somewhat pointed frontal pole—*Macropus*, *Thylacinus*, *Thylaceo* (Gervais, 14). These are examples of cerebral folds directly resulting from the restraining influence of the cranial wall upon the growing pallium. In the case of the tuberculum olfactorium and olfactory bulb it is clearly demonstrated how that local conditions of over-growth—localised hypertrophy of certain regions—can produce irregularities in the brain surface, which mould the growing brain-case and determine to a large extent its shape.

The united basi-occipital and basi-sphenoid mass forms a relatively broad, gradual slope, which extends from the *foramen magnum* upwards and forwards as far as the *foramina lacera antica*. This sloping surface is perforated on either side of the middle line at about the middle of the basisphenoid by the carotid foramen. Between these foramina the pituitary body rests upon the basisphenoid, roofed over by a thin fold of dura mater. Dr. Stirling, who described (38) such of the inner aspect of the cranium as could be seen through the *foramen magnum*, says that the floor "rises in front of the basisphenoid region into a well-marked eminence, which slopes away on either side. Anterior to this again the floor is flat." The anterior flat area is the broad cribriform plate of the ethmoid. In the middle line this is continued backwards into the well-marked eminence, which appears to be formed by the meeting of the orbito-sphenoids. On either side of this ridge, and behind the cribriform plate, the floor rapidly slopes away into a well-marked hollow, which lodges the tuberculum olfactorium. The posterior part of this hollow is formed by the alisphenoids, whilst laterally it extends well on to the lateral cranial wall, where the parietal takes a share in its formation. Mesially it extends as far as the basisphenoid.

Extending forwards and outwards into each of these fossæ there is a fissure—the sphenoidal—which, with its fellow of the opposite side, forms a blunt V-shaped slit, which limits the sphenoethmoidal eminence posteriorly. The *foramen ovale* is external to the carotid foramen. Immediately external to the former the alisphenoid is raised into a large thin-walled eminence, which extends forwards as far as the fossa for the tuberculum olfactorium. This is the roof of the tympanic bulla and corresponds on the brain to the deep depression behind the tuberculum and slightly internal to the pyriform lobe. In *Perameles* the corresponding structure only extends forwards as far as the level of the *foramen ovale*. This bulla in *Notoryctes* forms a large well-marked eminence of elliptical outline, whose posterior extremity touches the tip of the petrous temporal, which is directed forwards. In this way a deep fossa is formed for the natiform eminence on the outer side of the bulla. The greater part of this fossa is formed by the alisphenoid, but it is bounded also in part by the petrous and squamous temporals. The opening of the large floccular fossa on the dorsal aspect of the petrous periotic is directed inwards and forwards. The attachment of the tentorium cerebelli to the basisphenoid helps to deepen the trough in which the large trigeminal nerve lies, and separates it from the pituitary.

The resemblance between the base of the brains of *Notoryctes* and *Perameles* is much more striking than is that of the *basis cranii*. The brain is modified directly in relation to certain functional demands, whereas the basis cranii is moulded to accommodate the altered brain, without modifying its essential morphology.

Mesial Aspect.

In the greater part of its extent the mesial surface of the cerebrum is flat, and separated from the corresponding part of the other hemisphere by the falx cerebri. Posteriorly and inferiorly, however, it is deeply hollowed out, or rather, pushed outwards by the thalam- and mes-encephalon, the upper part of the posterior extremity of the hemisphere forming a kind of cap for these structures. At the anterior and lower part there is a large pale area (fig. 3 *p.a.*), which is situated immediately behind the olfactory bulb. Elsewhere (36) I have proposed the name *precommissural area* for this region. Inferiorly it is directly continuous with the tuberculum olfactorium *(t.o.)*, from which it differs in being of a lighter color. Dorsally it is continuous with the anterior extremity of the fascia dentata *(f.d.)*, while posteriorly it is directly continuous with the thickened lamina terminalis (*s.*), which is the homologue of the septum lucidum of Eutheria. It resembles the latter structure very closely histo-

logically as well as, probably, functionally, and the two regions are very closely associated in development. They resemble one another, moreover, in the fact that they both transmit fornix fibres, and, like the tuberculum olfactorium, present a very atypical cortical structure, which consists of diffusely scattered small polyhedral cells, and which has no ventricular medullary coating. Meyer (26) is of opinion that these regions ought not to be called cortex, and calls them "*ganglion masses.*" This precommissural area is the homologue of the "intraventricular lobe" of Herrick (17), the "Fornix-leiste" of Edinger (9), the anterior part of the "septum pellucidum" in Reptiles according to Meyer (25), the "Ammonswulst" of Rabl-Rückhard (31). It forms the anterior part of the region called "septal area" by Huxley and Flower (11). It is pale in color, from the fact that a large number of fornix fibres, which Huxley distinguished as "precommissural fibres" lie in its substance, separated from the surface by a slight grey coating.

The rest of the grey matter of the mesial hemisphere wall is divided into two almost equal parts by a well-marked regularly-arched sulcus—the *fissura arcuata* (Arnold) or hippocampal fissure (fig. 3, *h.f.*). The fissure begins in front, just behind the olfactory bulb, and slightly nearer the dorsal than the ventral margin of the hemisphere. From this point it curves backwards parallel to the margin of the hemisphere to terminate at the "temporal" pole. The external lip of this fissure is the *subiculum cornu Ammonis.* It is pale, from the presence of the superficial medullary lamina of the hippocampus. Corresponding to the concavity of the fissure, there is a broad band of grey matter concentric to the subiculum. This is the *fascia dentata*, which is also pale from the presence of medullated fibres in its molecular layer. Lying internal (concentric) to the fascia dentata *(f.d.)* is the broad white band of the *fimbria (fi.)*, separated from the fascia dentata by a shallow fimbrio-dentate sulcus. The great width of the fimbria is striking, especially when seen in transverse section (fig. 5, *fi.*). The posterior part of the vertical portion of the fimbria (just that part, as it happens, which in fig. 3 is shaded, corresponding to the depression for the mesencephalon) is quite grey in color from the fact that the cornu Ammonis may be seen through the very thin layer of alveus fibres in this region. In the whole extent of the choroid fissure the fimbria is related to it, forming either its dorsal or posterior boundary.

Immediately behind the precommissural area there is the thick mass of grey matter which is developed from the lamina terminalis. It is bounded below by the anterior commissure, which really lies in it, and dorsally it is separated from the fascia dentata in *Ornithorhynchus* by the hippocampal commissure (37)

When the hippocampus bends down posteriorly with the hemisphere, as it does in Marsupials, the hippocampal commissure takes a corresponding bend (35), so that it limits the thickened lamina terminalis behind and below as well. This thickened lamina terminalis represents the septum pellucidum of Eutheria, and corresponds to the appearance seen, according to Marchand (23) and Paul Martin (24), in the development of the commissures of higher Mammals. It corresponds to part of Rabl-Rückhard's (31) "*Ammonswulst*," which lies external to, rather than below, the hippocampal commissure in Reptiles. In the evolution of the septum lucidum a gradual progression may be seen from Reptiles to Platypus, from the latter to the Marsupial condition, and from the latter to the lowly Eutheria such as *Erinaceus* or the Edentata.

The large rounded section of the anterior commissure will be seen in the lower part of the lamina terminalis, and in the upper part the large V-shaped sagittal section of the hippocampal or fornix-commissure. The relative size of these two commissures is about the same as in *Perameles*. The hippocampal commissure of course varies directly in size with the hippocampus. The anterior commissure, however, is a compound bundle, composed of a rhinencephalic and a pallial part, each of which varies with the size of its area of "Ursprungzellen." In Eutheria, however, a considerable part of the pallium is connected by the corpus callosum. Hence in them the size of the anterior commissure will depend largely (but not wholly) upon the size of the olfactory bulb (of course the pyriform and tuberculum increase proportionately to the bulb). Thus among the Edentata with their small pallium and large rhinencephalon (Turner, 41, Rabl-Rückhard, 30) and in *Erinaceus* (Flower, 11), the anterior commissure is very large. In all Marsupials and Monotremes it is large, because it takes the place of the corpus callosum, and connects the whole of the pallium, so that it is very large in the higher members like *Echidna*, *Macropus*, and *Thylacinus*, which have large pallia.

In *Notoryctes* (as in all Marsupials) the hippocampal commissure is bilaminar (fig. 10), consisting of a dorsal *(ps.d.)* and a ventral limb (*ps.v.*), connected posteriorly by a "*splenium*" (*spl.*). These two parts do not, however, correspond to the *psalterium dorsale et ventrale* of Honegger (21) in placental Mammals, since the ventral limb *(ps.v.)* of the Marsupial hippocampal commissure is the representative of the *whole* psalterium of Eutheria (35). In addition to the hippocampi, the hippocampal commissure also connects the precommissural areæ. This part corresponds to the "corpus callosum" of Herrick and the "*commissura pallii anterior*" of Rabl-Rückhard (31). Arguing from the arrange-

ment of the commissures and the parts they connect in *Ornithorhynchus* one would expect the whole of the dorsal commissure of Sauropsida to be hippocampal and the parts it connects hippo campus. The accounts of Meyer and Edinger of the structure of these parts of the reptile brain afford strong confirmatory evidence in favor of this presumption; and there does not seem to be the slightest ground for the belief that a corpus callosum is present in any animal outside the Eutheria. Osborn's attempt (27) to demonstrate this clearly shows the weakness of his case by the manner in which he misrepresents the condition of affairs in the foetal *Macropus*, which, as the connecting link in his series between the Eutheria (where alone *à priori* the presence of a corpus callosum is granted) and the submammalia, forms the crux of the whole argument.

It will be noticed from fig. 3 that the fascia dentata is exposed n the whole of its extent, and forms a considerable segment of the mesial hemisphere wall. In a transverse section through the hippocampus in *Notoryctes* (fig. 6) it will be seen, moreover, that the fascia dentata *(f.d.)* in its whole width forms part of the mesial hemisphere wall. In *Perameles* (fig. 7), although it still shares in the formation of the mesial surface, it will be seen that a considerable part of it is overlapped by pallium. In Platypus in the greater part of its extent (fig. 8 and 36, fig 1), and in *Macropus* (fig. 9) in the whole of its extent, the fascia dentata does not form any part of the median surface of the cerebrum, being completely hidden by a pallial operculum.* In *Petaurus*, *Phalangista*, and *Potoroo* the fascia dentata is hidden throughout. In *Dasyurus* and *Phascolarctos* it is partially exposed, but in *Perameles* and *Notoryctes* it may be seen throughout. In addition to this effect of the increased development of the pallium in hiding the hippocampus, it also has an influence upon the morphology of the region. Thus in no other Mammal does one find the simplicity of arrangement which the hippocampus of *Notoryctes* presents (fig. 6), an appearance which recalls the foetal hippocampus in *Perameles* and *Macropus*. In any non-placental Mammal, however, if the hippocampal region be examined at its anterior extremity the complexity of the region gradually disappears by the gradual unravelling of the complicated folds, which are seen in figures 7, 8, and 9. In this process of simplification a stage may be found in any Metatherian brain closely resembling that exhibited throughout in *Notoryctes*. It may be readily seen in any Monotreme or Marsupial brain that the pyramidal

* In all Marsupials and Monotremes the anterior extremity of the *fascia dentata* appears on the surface; so that the above remarks only apply to that part which is placed behind the situation of the hippocampal commissure.

and polymorphous cells of the cornu Ammonis become continuous at the upper (figs. 6 and 8) border of the fascia dentata with the *stratum granulosum* and *nucleus fasciæ dentatæ*. The fascia dentata, together with the nucleus fasciæ dentatæ, forms a single convolution, so that the opinions of Duval (7), Golgi, and Sala (32), that these two parts are independent receives no confirmation from the examination of the Metatherian condition. The fascia dentata (including the nucleus fasciæ dentatæ, as Henle, Krause, Huguenin, Schwalbe, Meynert, and Obersteiner, among many others, consider it) forms the edge of the true cortical structure, although it is nowhere a morphologically free edge. In the greater part of its extent the hemisphere wall has a morphological representative in the epithelial fold of the choroid plexus. In front of the foramen of Monro, where the choroid fissure is absent, the fascia dentata (with its deeper layer, the "nucleus") becomes continuous inferiorly with another part of the hemisphere wall, which lacks a cortical structure—the precommissural area, which Meyer has described as a ganglion mass without cortex (26). Thus the fascia dentata in the whole of its extent forms the edge of the true cortex. These statements are borne out by the examination of series of fœtal *Ornithorhynchus*, *Perameles*, and *Macropus* brains.

Although it will be granted that the *pes hippocampi* is a very specially modified part of the cortex, still there does not appear to be any justification for believing, with Giacomini, that it does not represent any convolutions, since it is already highly convoluted in brains otherwise smooth. The hippocampus is equally convoluted in all Mammals, because it reaches its maximum development quite early in the phylogenetic history of the individual. Thus in Platypus it possesses a histological differentiation, quite as complex and fine, as is found in the highest mammal. Like the pyriform, it is developed early both in phylogeny and ontogeny in accordance with the development of the olfactory apparatus. Because part of the smell centre should reach a high state of development, when the pallium is not proportionately intricate, is no argument that the cortex of the smell centre does not behave like the rest of the cortex in similar circumstances. It should be noted, however, that, intimate as is the connection between the hippocampus and olfactory lobe, the relative sizes of the two parts are by no means constant. Thus, in spite of the marked relative difference in the sizes of the olfactory bulb in *Ornithorhynchus* and *Perameles*, there is little appreciable difference in the sizes of their hippocampi. In *Notoryctes* the size of the hippocampus is relatively small, considering its huge olfactory. What determines the size of the hippocampus is hard to say.

In studying such a brain as that under consideration, one can-

not but be struck with the inappropriateness of Broca's limitation of the limbic lobe (4). Thus Schäfer says (34, p. 155):—"The *callosal gyrus*, with its continuation the *hippocampal gyrus*, were separated by Broca, on morphological grounds, from the other parts of the hemisphere, as a distinct lobe, intimately united in front and below with the olfactory lobe; and the name of *grande lobe limbique* was given by him to these combined lobes. To this lobe of Broca, Schwalbe added the other central parts of the mesial wall of the hemisphere, viz., the *lamina septi pellucidi* and the *dentate convolution*, as well as the *fornix*; . . . naming the whole lobe thus reconstituted the "falciform lobe," the olfactory lobe being, however, excluded." In this modified form Broca's idea is generally accepted to-day, as the above quotation from a recent standard text-book shows.* Yet, what grounds had Broca for this definition of his lobe? As the result of an examination of a series of Mammalian brains, he came to the conclusion that the different parts of this lobe, "qui peut donc être comparé à une raquette dont l'anneau entourant le seuil de l'hémisphère," was intimately connected with the olfactory bulb. The callosal gyrus, however, is not connected with the olfactory lobe, and the only relation which it has with the rhinencephalon is by means of associating fibres, such as proceed also to other parts of the pallium. The callosal gyrus therefore, from the histological and comparative standpoint, has no more right to be considered as part of the limbic lobe than any other part of the pallium. Again, a glance at the cerebrum of *Notoryctes* shows that the "limbic lobe" of Broca is not "*limbic*," since it does not form the border of the hilus. The true limbic lobe (which is also undoubtedly associated with the olfactory) is formed of a morphological dorsal limb—the hippocampus, and a ventral—the pyriform lobe meeting behind (*vide* 36, fig. 1), where the latter overlaps the former; and united in front by the precommissural area and tuberculum olfactorium. In *Notoryctes* (fig. 3) the true upper limb of this lobe forms not only the upper, but also the posterior, and part of the inferior, arcs, the pyriform forming the anterior part of the inferior arc. The limbic lobe, as thus defined, corresponds to Turner's "rhinencephalon." In Eutheria where the dorsal—horizontal—limb of the hippocampus disappears, the rudiment of that structure—the *induseum griseum* of Obersteiner (*gyrus supracallosus* and *gyrus geniculi* of Zuckerkandl (43) including the *striæ Lancisii*)—represents the dorsal limb, with the *gyrus subcallosus* of Zuckerkandl, and *locus perforatus anticus* as anterior connections.

**Note.*—Debierre (6) has recently questioned the propriety of including the callosal gyrus in the falciform lobe (as also has Edinger, 8), and came to the same conclusion as that arrived at here, though working from a different standpoint.

In *Notoryctes* it will be seen that the "*limbic lobe*" forms the great bulk of the cerebrum, the dorsal limb or hippocampus extending almost to the outer margin of the hemisphere, and the ventral limb or pyriform extending round the ventral border to form the greater part of the lateral wall. Thus as the pallium diminishes the two limbs of the falciform lobe approach one another at the dorsal part of the cerebrum. If the pallium were reduced much below that of *Notoryctes* the hemisphere would be practically "limbic lobe." I have already referred to the fact that in reptiles the hippocampus even extends from the mesial on to the dorsal surface. If, then, the statement of Meyer (26) that "die Rindenabteilung, welche bei den Säugern der inneren Kapsel Ursprung giebt, ist bei den Reptilien noch nicht entwickelt" be accepted, it must be admitted that the hemisphere of Reptiles is reduced to "limbic lobe," *i.e.*, that the pallium (in the sense of Turner) disappears. This is supported by Edinger's statement (10) that a pallium is "added," and by Brill's belief that the cerebrum of submammalia is wholly olfactory (3).

The extremely intimate connection of the peripheral olfactory apparatus with the cerebrum of lower vertebrates, and even in the majority of Mammals, is a very significant fact when contrasted with the much slighter connections of the other sensory apparatus.

The olfactory sense has a physiological significance in lower Mammals which it is hard to over-estimate. It constitutes, as Broca has pointed out (5), the guide and director of the animal in the absence of a higher intelligence. In an animal as high in the scale of intelligence as the dog it constitutes the main source of information in its search for food and in its recognition of the other sex. How much more important must the sense of smell be in the sightless *Notoryctes*, with practically no pallium as a basis for intellectual operations! In its search for food and in its sexual relations—the two pursuits which must constitute almost its whole existence—it relies almost solely upon its sense of smell, which as a kind of highly specialised and complicated reflex guides the animal through life.

Associated with this extreme physiological importance of the sense of smell the olfactory organ presents many unique anatomical features. The peripheral part of the olfactory apparatus maintains in the highest Mammals a simplicity of structure which characterises the whole peripheral sensory apparatus in worms, according to Lenhossek and Retzius,—a fact which is probably indicative of a very early specialization of function. This peripheral apparatus early in development obtains an insertion into a diverticulum of the cerebrum itself—into its morphological anterior pole. Early in phylogeny this part of the cerebrum, which

is now entirely given up to the olfactory apparatus, becomes closely associated by numerous fibre strands with the earliest parts of the cerebrum to appear—the tuberculum olfactorium, the corpus striatum, the pyriform and hippocampus.

Thus, just as the earliest psychical life—if such an expression may be used—is largely influenced by olfactory impressions, so the early morphology of the cerebrum is dominated to a large extent by the olfactory apparatus.

Lateral Ventricle.

The lateral ventricle is a narrow slit-like cavity, with a descending posterior and a descending anterior horn, of which the olfactory ventricle is a diverticulum. Projecting into the ventricle in the whole of its extent is the large *hippocampus major* (figs. 4 and 5, *h.*) on its inner wall. This is of a white color, owing to its coating of alveus fibres. The inner wall of the anterior part and of the anterior horn is largely formed by a prominent grey mass, which is the combined "septum lucidum" and precommissural area. The roof and upper part of the lateral wall is formed by the *corona radiata* (figs. 4 and 5, *cr.*). The floor and lower part of the lateral wall is formed by the grey mass of the corpus striatum.

The degree of bending of the lateral ventricle is one of the features by which the Monotreme is distinguished from the Marsupial cerebrum. Thus in *Notoryctes* the bend of the ventricle to form a descending horn posteriorly is more extensive than that found in Echidna, and much greater than that found in *Ornithorhynchus*, in spite of the much higher pallial development of both Prototheria.*

The Corpus Striatum.

The corpus striatum forms a plump elongated grey mass which projects into the lateral ventricle and extends into its descending horn. It is separated from the cortex externally by a thin layer of medullated fibres, which constitutes the corona radiata (fig. 5, *cr.*). In the greater part of its extent the corona radiata forms a kind of shell (fig. 4), which supports the corpus striatum. In front of the anterior commissure the corpus striatum extends into the tuberculum olfactorium with which it is closely connected; hence the name which Ganser applied to the latter structure (13). Behind the anterior commissure the grey matter of the corpus striatum is directly connected with the cortex of the pyriform lobe, the connecting bridge being the *nucleus amygdalæ* (fig. 5, *n.a.*). Throughout its whole length the corpus striatum is divided

---

* See supplementary note.

into *nuclei caudatus* (figs. 4, 5, *n.c.*) and *lenticularis* (*n.l.*) by an imperfect *internal capsule* (*i.c.*). The internal capsule consists of a number of scattered bundles of fibres, which, however, form a more definite tract than the scattered fibre-system in *Platypus*, in spite of the larger pallium in the Monotreme.

Fibre Tracts in the Cerebrum.

It will not be necessasy to do more than mention the general arrangement of the fibres, since it does not differ to any extent from that found in other non-placental Mammals, the disposition of whose cerebral tracts I have described in greater detail elsewhere (37). The corona radiata (*c.r.*) forms the deepest layer of the cortex cerebri, forming the lateral wall of the lateral ventricle above and an external capsule below, separating the corpus striatum from the cortex (fig. 5). No *centrum semi-ovale* can be said to exist. Above the ventricle the corona becomes very thin, and terminates in the region of the subiculum cornu Ammonis, where its fibres mingle with those of the alveus. Below, a very considerable proportion of its fibres cross the middle line in the lamina terminalis, forming part of the anterior commissure. The anterior commissure connects the corpora striata, "pallia," pyriform lobes (including nuclei amygdalæ), tubercula olfactoria, and olfactory bulbs (probably only the prosencephalic part and peduncle). The *pars olfactoria* of the anterior commissure consists of a very large compact bundle (fig. 11), which takes a sudden bend forwards in the corpus striatum, and, passing through the olfactory peduncle on the outer side of the ventricle, radiates into all parts of the olfactory bulb, closely intermingled with the fibres of the olfactory radiations.

There is no justification for dividing the rest of the commissure into *pars frontalis* and *temporalis* (Flower, Osborn). The great bulk of the anterior commissure corresponds to Koelliker's *pars posterior* (15), which runs in the external capsule. In considering this part of the commissure in Marsupials it must always be remembered that a considerable proportion of these fibres represent the corpus callosum of Eutheria, and therefore cannot be compared to any part of the anterior commissure proper.

The fornix system in *Notoryctes*, as in all Marsupials, exhibits an extreme simplicity, and is not divided up into *fornix obliquus* or *f. longus* of Forel, nor is the *stria Lancisii* separated from the rest of the fornix fibres.

It will suffice to give here little more than a list of the olfactory tracts, elucidated mainly by comparison with *Perameles*.

a. The *external olfactory radiation* (Edinger) arising in the olfactory bulb and terminating upon the surface of the pyriform lobe and tuberculum olfactorium.

i. The pyriform lobe is connected by association fibres to the nucleus amygdalæ, corpus striatum, and pallium of its own side, and with the pyriform of the opposite hemisphere by the anterior commissure.

ii. The tuberculum olfactorium is intimately connected with the corpus striatum, and with the pallium by means of a large fibre bundle—the probable homologue of the *anterior segment of the cingulum* (Beevor, 2). It is also connected with the hippocampus by the *Riechbundel* of Zuckerkandl (fig. 10, *R.*).

b. The *internal olfactory radiation* (fig. 11, *i.o.r.*) arising in the olfactory bulb and terminating mainly in the precommissural area, but partly also in the hippocampus (36), and probably in the tuberculum olfactorium.

c. The *peduncular projection bundle* extends from the olfactory lobe backwards through the floor of the thalamencephalon to enter the pes pedunculi mainly. Some fibres probably terminate in the mammillary region (figs. 4 and 11, *p.p.b.*).

d. The *pars olfactoria* (fig. 11, *p.o.*).

e. The *olfactory bundle* of Zuckerkandl (fig. 10, *R.*).

i. A series of fibres arising in the precommissural area and tuberculum olfactorium, proceeding backwards in the fornix to terminate in the hippocampus.

ii. A series of fibres arising from the pyramidal cells of the hippocampus, and after passing through fornix and septum, terminating in the base of the cerebrum in the region of the nucleus amygdalæ (fig. 10, *B.*).

It is to be hoped that before long better material will be available with which to supplement these imperfect notes upon the nervous system of this interesting Mammal. For, quite apart from the deep interest attaching to the anatomy of this aberrant and peculiar Marsupial, the brain of *Notoryctes* presents to the comparative neurologist quite a number of instructive features of the deepest interest and highest importance.

REFERENCES TO LITERATURE.

1. Beddard, F. E., "On the Pouch and Brain of the Male Thylacine." Proceedings of the Zoological Society of London, 1891, p. 138.

2. Beevor, C. E., "On the Course of the Fibres of the Cingulum, &c." Philosophical Transactions B., 1891.

3. Brill, "The True Homology of the Mesal Portion of the Hemispherical Vesicle in the Sauropsida." Medical Record, 1891, quoted by Strasser (Merkel and Bonnet's Ergebnisse).
4. Broca, P., "Le Grande Lobe Limbique, &c." Revue d'Anthropology, 1878.
5. Broca, P., "Recherches sur les Centres Olfactifs." Revue d'Anthropology, 1879.
6. Debierre, C., "Qu'est-ce que le Lobe Limbique?" Abstract in Arch. Ital. de Biologie, Tome XXI., Fasc. III., p. xxi.
7. Duval, "La Corne d'Ammon." Arch. f. Neurologie, 1881.
8. Edinger, L., "Vorlesungen Ueber den Bau der Nervösen Centralorgane, &c." Fourth edition.
9. Edinger, L., "Vergleichend. Entwick. und Anatomische Studien im Bereiche der Hirnanatomie. 3. Riechapparat und Ammonshorn." Anat. Anz. VIII., 10, 11.
10. Edinger, L., "The Significance of the Cortex, &c." Journal of Comparative Neurology III., p. 69.
11. Flower, W. H., "On the Commissures of the Cerebral Hemispheres of the Marsupialia and Monotremata, &c." Phil. Trans., 1865.
12. Forbes, W. A., "On Some Points in the Anatomy of the Koala." P. Z. S., 1881.
13. Ganser, S., "Vergleichend-Anatomische Studien über das Gehirn des Maulwurfs." Morph. Jahrbuch Bd. VII.
14. Gervais, "Memoire sur les Formes Cérébrales Propres aux Marsupiaux." Nouv. Arch. Mus., t. v.
15. von Kœlliker, A., "Ueber den Fornix Longus von Forel und die Riechstrahlungen im Gehirn des Kaninchens." Verhand. der Anat. Gesellschaft, 1894.
16. Leche, W., "Beitrage zur Anatomie des Myrmecobius." Verh. Biolog. der Stockholm, 1890.
17. Herrick, C. L., "Cerebrum and Olfactories of the Opossum." Bulletin of the Scientific Laboritories of Denison University, vol. VI., pt. 4.
18. Herrick, C. L., "Callosum and Hippocampus in Marsupial and Lower Brains." Journal of Comparative Neurology, vol. III., p. 129.
19. Hill, A., "The Cerebrum of Ornithorhynchus paradoxus." Philosophical Transactions, 1893, B.
20. Hill, A., "The Hippocampus." Phil. Trans., 1893, B.
21. Honegger, J., "Vergleichend Anatomische Untersuchungen ueber den Fornix, &c." Recueil Zoolog. Suisse. Tome V., 1890.
22. Hyrtl, J., "Chlamydophori truncati cum Dasypode gymnuro Comparatum Examen Anatomicum." Denkschriften der Kaiserlichen Akadamie der Wissenschaften, Bd. IX.

23. Marchand, F., "Ueber die Entwickelung des Balkens im Menschlichen Gehirns." Arch. f. Mikr. Anat., Bd. XXXVII.
24. Martin, Paul, "Zur Entwickelung des Gehirnbalkens bei der Katze." Anat. Anz., Band IX.
25. Meyer, Adolf, "Ueber das Vorderhirn Einiger Reptilien." Zeitschrift f. Wissenschaftliche Zoologie, Bd. LV.
26. Meyer, Adolf, "Zur Homologie der Fornixcommissur und des Septum Lucidum bei den Reptilien und Säugern." Anat. Anz., Bd. X., 15.
27. Osborn, H. F., "The Origin of the Corpus Callosum," &c. Morph. Jahrb., Bd. XII.
28. Owen, Richard, "Structure of the Brain in Marsupial Animals." Phil. Trans., 1837.
29. Owen, Richard, "Comparative Anatomy."
30. Rabl-Ruckhard, H., "Einiges über das Gehirn der Edentata." Arch. f. Mikr. Anat., Bd. XXXV.
31. Rabl-Ruckhard, H., "Einiges über das Gehirn der Riesenschlange." Zeitschrift f. Wissensch. Zoologie, 1894.
32. Sala, L., "Zur Feineren Anatomie des Grossen Seepferdefusses." Zeitsch. f. Wissensch. Zoologie, 1891.
33. Sander, Julius, "Ueber das Quercomm. des Gehirns bei den Beutelthieren." Arch. f. Anatomie, 1868.
34. Schäfer, E. A., "Quain's Anatomy." Tenth Edition, vol. III., part 1.
35. Smith, G. Elliot, "A Preliminary Communication upon the Cerebral Commissures," &c. Proc. Linn. Society of N.S.W., vol. IX., part 4, 1894.
36. Smith, G. Elliot, "The Connection Between the Olfactory Bulb and the Hippocampus." Anatomischer Anzeiger, X. Band, Nr. 15.
37. Smith, G. Elliot, "The Comparative Anatomy of the Cerebrum of Platypus." M.D. Graduation Thesis, Sydney, 1895.*
38. Stirling, E. C., "Description of a New Genus and Species of Marsupialia—Notoryctes typhlops." Trans. Roy. Soc. of South Australia, vol. XIV., part 1.
39. Symington, J., "The Cerebral Commissures in the Marsupialia and Monotremata." Journal of Anatomy, vol. XXVII.
40. Turner, W., "On the Anatomical Relations of the Surface of the Tentorium to the Cerebrum and Cerebellum in

---

* *Note.*—I had hoped that before the publication of this paper this Thesis would have been in print, but so far have only been able to publish a few short abstracts of special parts.

Man and Lower Mammals." Trans. Roy. Soc. of Edinburgh, vol. IV., p. 549.
41. Turner, W., "On the Brain of Dasypus sexcinctus." Journal of Anatomy, vol. I.
42. Turner, W., "The Convolutions of the Brain." Journal of Anatomy, vol. XXV.
43. Zuckerkandl, E., "Ueber das Riechcentrum."
44. Zuckerkandl, E., "Ueber d. Riechbundel des Cornu Ammonis." Anat. Anz., III., 1888.

DESCRIPTION OF FIGURES.

Fig. 1.—*Lateral aspect of cerebrum of* Notoryctes. x 3.

References.

olf.b. Bulbus olfactorius.
t.o. Tuberculum olfactorium.
e.o.r. Radiatio olfactoria externa.
n.e. Eminentia natiformis.
pyr.l. Lobus pyriformis.
p. "Pallium" *(Turner).*

Fig. 2.—*Basal aspect of cerebrum.* x 3.

* Tubercle of grey matter at the termination of the external olfactory radiation.

The lines at *t.o.* and *pyl.l.* indicate the direction of the fibres given to the tuberculum and pyriform from *e.o.r.*

Other references as in fig. 1.

Fig. 3.—*Mesial aspect of cerebrum.* x 3.

p.a. "Precommissural area" (mihi).
a.c. Commissura anterior.
s. "Septum lucidum."
h.c. "Commissura hippocampi."
f.d. Fascia dentata.
h.f. Fissura hippocampi.
fi. Fimbria.

Fig. 4.—*Transverse section through the region of the anterior and hippocampal commissures.* x 7.

[Allowance must be made in these sections for considerable shrinkage during the embedding process. The measurements in figs. 1, 2, and 3 are corrected by comparison with the skull.]

Most references as in figs. 3 and 1.

n.c. Nucleus caudatus.
i.c. Capsula interna.
h. Hippocampus.
p.p.b. Olfactory "peduncular projection bundle" (mihi)—the "middle root" of Broca.
c.r. Corona radiata.

In the septum (*s.*), on the left side, are seen numerous descending fibres. These are partly fibres of the *columna fornicis* and partly precommissural fibres of Huxley (Riechbundel of Zuckerkandl).

Fig. 5.—*Transverse section behind the commissural region. Camera lucida drawing* x 7, *from a section stained with anilin blue-black.*

h.f. Fissura hippocampi.
h. Hippocampus (the letter points to the fascia dentata).
fi. Fimbria.
c.r. Corona radiata.
n.c. Nucleus caudatus.
n.l. Nucleus lenticularis.
i.c. Capsula interna.
n.a. Nucleus amygdalæ.

Fig. 6.—*Transverse section hippocampus.* Notoryctes.

Fig. 7.—*Transverse section hippocampus.* Perameles.

Fig. 8.—*Transverse section hippocampus.* Ornithorhynchus.

Fig. 9.—*Transverse section hippocampus.* Macropus.

Figures 6-9 *are drawn to different scales, but are all taken from corresponding regions.*

alv. Alveus.
x. Subiculum cornu Ammonis.
h.f. Fissura hippocampi.
f.d. Fascia dentata.
fi. Fimbria.
c.r. Corona radiata.

Fig. 10.—*Sagittal section through the median hemisphere wall in the commissural region.* Perameles. Drawn by camera lucida. Weigert-Pal stain. x 5.

The appearance in *Notoryctes* would be almost exactly identical with this.

a.c. Commissura anterior.
ps.d. Commissura hippocampi—crus dorsale.
ps. v. Crus ventrale.
spl. "Splenium commissuræ hippocampi" (mihi).
s. "Septum lucidum" (lamina terminalis).
a.f. Columna fornicis.
R. Riechbundel des cornu Ammonis *(Zuckerkandl)* lying in the precommissural area of the median hemisphere wall.
A. Fibres of the *Riechbundel* passing directly to the hippocampus without passing through the fornix.
B. Fibres directed backwards below *a.c.* to the floor of the thalamencephalan.
j. Fibres directed forwards to the olfactory bulb and base of brain (tuberculum olfactorium and lower part of precommissural area).

Fig. 11.—*Horizontal section through the olfactory bulb and peduncle.* Notoryctes. x about 8.

p.o. Pars olfactoria commissuræ anterioris.
p.p.b. "Olfactory peduncular projection bundle."
e.o.r. Radiatio olfactoria externa.
i.o.r. Radiatio olfactoria interna, its fibres extending into the precommissural area *(p.a.)*.
v. Ventriculum olfactorium.
1. Layer of glomeruli and nerve fibres.
2. Layer of mitral cells.
3. Layer of diffuse nerve fibres.
4. Layer of compact nerve fibres.

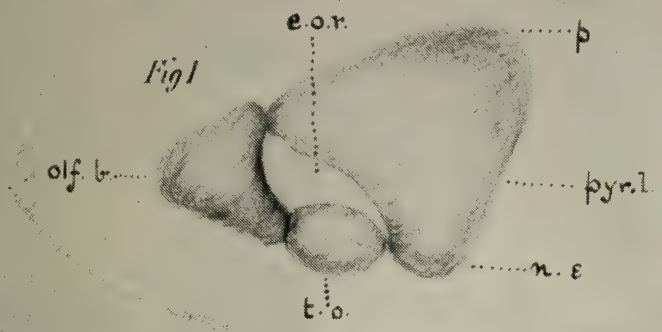


Fig 1

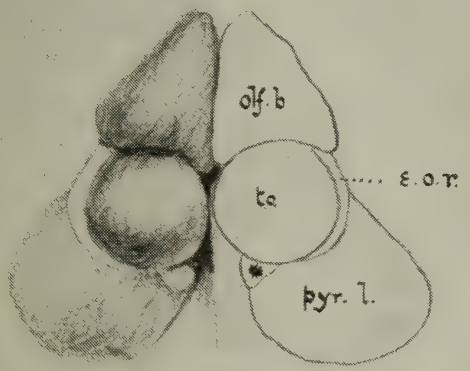


Fig 2

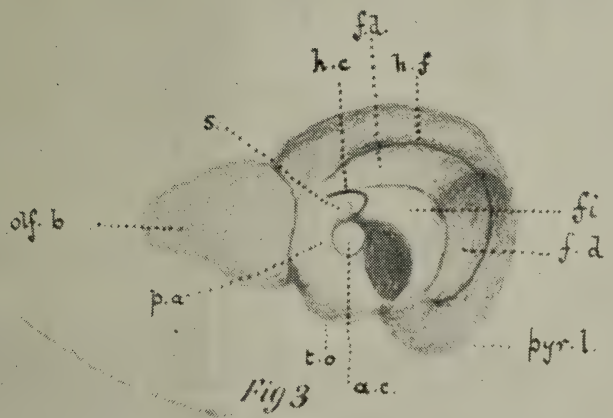
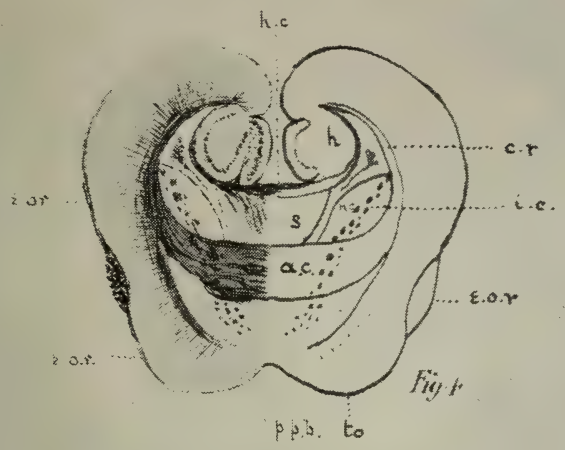
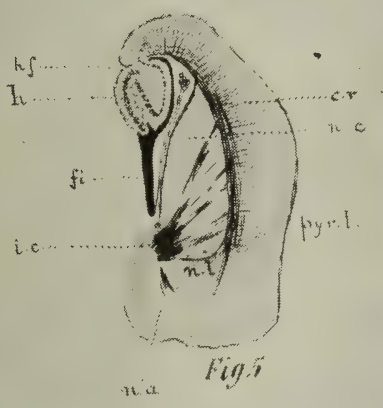
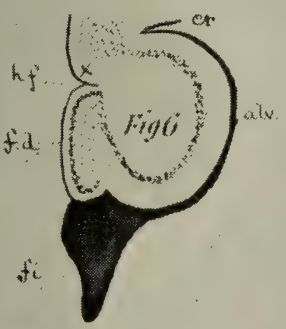


Fig 3

G. Elliot Smith, Del.


h.c
h
c.r
s
i.c.
a.c.
e.o.r
Fig 4
p.p.b.
to


hf
h
c.r
n.c
fi
pyr.l.
i.c
n.l
Fig 5
n.a


cr
hf
Fig6
alv.
fd
fi

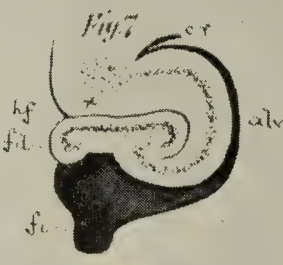


Fig7
cr
hf
alv
fd
fi

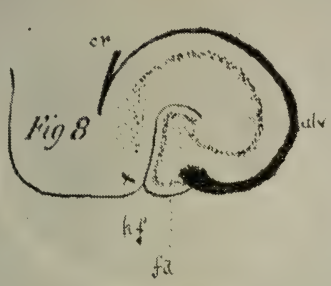


Fig 8

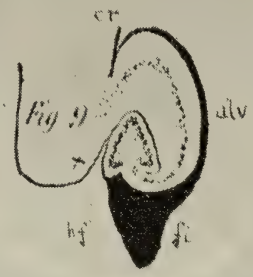


Fig 9

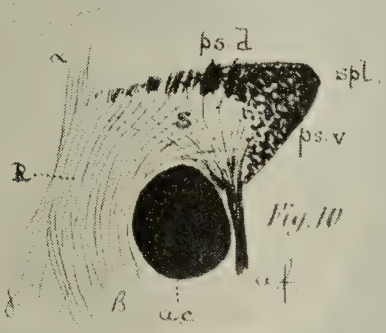


Fig. 10

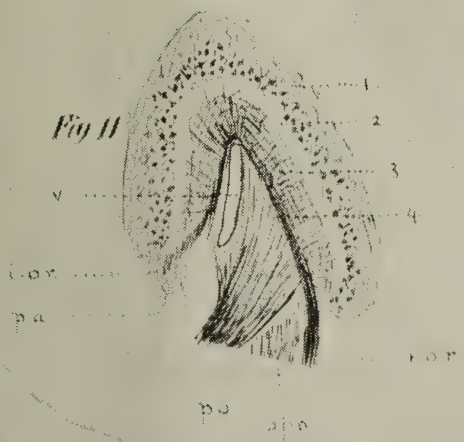


Fig 11

EXPLANATORY NOTE.

An examination of a large quantity of fresh Monotreme-material since this paper was written has convinced me that undue importance has been attached to the degree of flexion as an index of a Monotreme cerebrum. Thus in *Ornithorhynchus* the hippocampus possesses quite an extensive descending limb. It is, however, of a very diminutive size, and in all my earlier specimens had become knocked off in preparation for cutting. It is so small, however, and its fimbria so insignificant that it may be neglected in discussing the morphology of the hippocampal commissure. In *Echina* also, the descending limb is much more extensive than my earlier examinations lead me to believe.

In my paper on the Platypus brain, which I expect to publish soon, the bearing of these facts will be fully discussed.

Carboniferous Foraminifera of Western Australia, with Descriptions of New Species.

By Walter Howchin, F.G.S.

[Read August 6, 1895.]

Plate X., figs. 1-8.

Some time ago I asked Mr. H. P. Woodward, Government Geologist of Western Australia, if he could procure any material of Carboniferous age that was likely to contain microzoa. Not having any of the argillaceous shales on hand, he kindly sent me a few brachiopod shells of this age which contained a little soft matrix in their interiors. Small as was the amount of material thus obtained, it has yielded three species of foraminifera which are of more than ordinary interest, not only as undescribed forms, but they are amongst the firstfruits of an old fauna in the Palæontology of Australia, of which we know but little at present.

The shells from which the material was gathered were obtained by Mr. Woodward from the Carboniferous shales of the Irwin River, about 200 miles north of Perth. With regard to these beds Mr. Woodward says—"The Lower Carboniferous outcrops upon the Irwin River, where there are a series of shales, fire-clays, sandstones, and limestones, with coal-seams. This formation extends north in a narrow strip to the Lyons River."*

The only other locality in Australia where foraminifera of this age are known to occur is in the Permo-Carboniferous Rocks of Tasmania,† but the species of the two localities, so far as recognised, are distinct.

The Western Australian material came to hand shortly before the Adelaide meeting of the Australian Association for the Advancement of Science, and the writer was able to report the occurrence and generic positions of these foraminifera in a paper read before the Association on "A Census of the Fossil Foraminifera of Australia."‡ For remarks on the distinctive features of the Australian Carboniferous foraminifera, as compared with

---

* Geolog. Mag. Dec. IV., vol. I., p. 545, Dec., 1894.

† "The Occurrence of Foram. in the Permo-Carb. Rocks of Tasmania," W. Howchin, Report of Fifth Meeting of Aus. Asso. for Adv. of Science, Adelaide, 1893, p. 344, pl. X., XI.

‡ *Op. cit.*, p. 348.

A.L.R.

those of presumably the same age in the Northern Hemisphere, see the article just mentioned.

In addition to the forms described in this paper, there is also present in the material a parasitic organism of doubtful relationship. It is not clear from the few examples obtained whether the object belongs to the foraminifera or annelida. This is held over for further investigation.

CORNUSPIRA SCHLUMBERGI, *sp. nov.* Pl. x., figs. 1-3.

Ref.—Cornuspira Schlumbergi, How., MS., Report of Fifth Meeting of Aus. Ass. for Adv. of Science, Adelaide, 1893, p. 366.

Test discoidal, flat or biconvex, convoluted ; consisting of a non-septate tube, slightly increasing in diameter, but with varying dimensions. Initial end of chamber spherical, and of greater diameter than the tube. Convolutions, about five in number, more or less asymmetrical, particularly in the earlier growth. Test-walls investing, each successive whorl enclosing all the preceding by alar extensions over the lateral surfaces of the shell. Periphery rounded, and somewhat irregular in outline. Septation obscured exteriorly by lamination of shell-walls, except near the orifice, where a sutural depression is visible for about half the length of the final convolution. Transverse section of tube round, or with slight vertical compression. Aperture formed by the open end of tube, more or less constricted at vent.

Diameter, $\frac{1}{40}$ in.

This is an interesting species, and diverges from the normal characteristics of the genus in two particulars—the irregular coiling of the earlier convolutions of the tube, and also in the lamination of the test-walls. The former of these features is subject to considerable variation. Some transparent sections show but slight divergencies of the spiralline arrangement of the chamber from one plane, whilst in others the tube has apparently coiled upon itself at almost right angles, as shown in fig. 3, plate x. Again, unlike other members of the genus, there is a complete investment of the earlier convolutions by successive layers of shell substance, obscuring the septation, and giving the shell a lenticular outline in transverse section. The irregular coiling of the tube in this species makes it isomorphic with *Ammodiscus gordialis* (P. & J.) in the arenaceous series. The duplication of the test-walls is a still more eccentric feature of this species. The thickening of the test in the umbilical region is produced, not by an excresence of shell substance, which not unfrequently occurs in certain species of foraminifera, but by an extension of the lateral flaps of the chambers in a similar manner to the nummulitic method of growth. This is shown in the transparent section, fig. 2, plate x.

In the lamination of the shell-walls, the present species shows a closer likeness to the genus *Planispirina* than *Cornuspira*, but the absence of segmentation in the chamber cavity fixes its position with the last-named genus.

Representatives of this genus have been observed in most geological formations of Europe, dating from the Lias, and it also occurs in rocks of Permo-Carboniferous age in Tasmania.*

It affords me much pleasure to associate the name of Mons. Schlumberger of Paris with this interesting species, not only because the transparent sections of this form now figured were kindly supplied by this eminent specialist, but the author has been laid under repeated obligation for services he has cheerfully rendered towards the working out and determination of obscure species.

NODOSARIA IRWINENSIS, *sp. nov.* Pl. x., fig. 7-8.

Ref.—Nodosaria species, Report of Fifth Meeting of the Aus. Ass. for Adv. of Science, Adelaide, 1893, p. 366.

Test elongate, straight or very slightly arcuate, tapering. Segments about eight in number. The shell either slightly inflated near the centre or gradually increasing in size. Chambers of greater width than length. Sutural lines straight, thick, and slightly depressed. Surface of test ornamented with numerous, closely set, longitudinal, and continuous costæ.

Length, $\frac{1}{33}$ in.

This is a Nodosarian of very short length, narrow chambers, banded sutures, and finely costated surface. It does not appear to agree with any previously described species. A finely ribbed Nodosarian shell has been figured from the Permian of Durham by Mr. T. Rupert Jones† and the late Dr. H. B. Brady,‡ and referred by the latter to *Nodosaria (Dentalina) multicostata*, d'Orb. But this is a very different species from the one now described, being markedly dentaline, with subglobular chambers that rapidly increase in size with the stages of growth. Messrs. Jones and Parker have also figured§ two fragments of a costated Nodosarian from the Triassic beds of Chellaston, near Derby, which are referred by the author to *N. lineolata*, Reuss. This is, however, a much larger shell than the one found in the R. Irwin beds, and has elongated elliptically-shaped chambers. The broad banded constrictions which mark the septation in

---

* *Op. cit.*, vol. V., p. 344.

† *Dentalina Kingii*, Monograph of the Permian Fossils of England, by W. King, Palæontog, Soc., 1850, pl. vi., figs. 2, 3.

‡ Monograph of Carboniferous and Permian Foraminifera, by H. B. Brady, Palæontog. Soc., 1876, pl. x., fig. 19.

§ Quart. Jour. Geo. Soc., vol. XVI. (Nov., 1860), pl. xix., figs. 11, 12.

N. Irwinensis may be compared with a similar feature in *N. vertebralis*, Batsch.; but the examples now under consideration do not exhibit the transparent shell substance in the septal bands which gives the vertebral appearance to Batsch's species. How far this feature may have been modified by age in the Western Australian species it is impossible to say. In other respects there is but slight similarity between the two species.

The genus *Nodosaria* (including *Dentalina*) is but sparingly represented in rocks of Palæozoic age. In Brady's "Monograph of the Permian and Carboniferous Foraminifera"* only three species are recorded, and the whole of these belong to the Permian or newest member of the division. A true *Nodosaria* was discovered by the present writer in one of the minor limestones of the lower Carboniferous series of Northumberland,† and a member of the same genus occurs in the Permo-Carboniferous rocks of Tasmania.‡ In the Carboniferous Limestone of the Northern Hemisphere its place seems to be taken by *Nodosinella*, a group of foraminifera with finely arenaceous tests, and which in form are to some extent isomorphic with the hyaline *Nodosariæ* of newer formations.

FRONDICULARIA WOODWARDI, *sp. nov.*

Ref.—Frondicularia species, Report of Fifth Meeting of the Aus. Ass. for Advancement of Science, Adelaide, 1893, p. 366.

Test elongate, tapering, compressed, and subject to to considerable variation in external form. Oral end broad, rounded, and regularly curved. Aboral extremity obtusely pointed. Peripheral margins rounded. Segments from seven to ten in number, gradually increasing in size, acutely arched. Final chamber relatively large, inflated, and lobulated. Sutures flush, marked by clear shell substance. Length of shell equals twice or three times the breadth.

Length of fine example, $\frac{1}{30}$ in.

This pretty little shell somewhat resembles *Frondicularia complanata*, Defr., but differs from that species in its elongate contour, fewer chambers, and conspicuous final segment. The segmentation is also less acute, particularly in the later chambers, which approach to a regular curve. A somewhat similar example to our species was figured by Messrs. Jones and Parker§ from the Upper Trias of Chellaston, Derbyshire. The authors referred to designate the form figured by them as a "variety" of *Frondicularia complanata*, Defr., but without further description. The

* Palæontographical Society, vol. XXX., 1876, pl. x., figs. 6-19.

† Jour. Royal Microscopic Society, 1888, part IV., plate ix., fig. 21.

‡ Report of Fifth Meeting Aus. Ass. for Adv. of Science, Adelaide, 1893, p. 347.

§ Quart. Jour. Geo. Soc., vol. XVI. (Nov., 1860), pl. XIX., fig. 19.

reasons which have led me to distinguish the present species from the one described by Defrance have already been stated. I have great pleasure in recognising the services of Mr. H. P. Woodward, F.G.S., Government Geologist of Western Australia (to whom I am indebted for the material that has supplied the foraminifera described in the present paper), by naming the present species after one who has done much valuable pioneer work in a country which, geologically, is but imperfectly known.

Until the present discovery the occurrence of *Frondicularice* in the Chellaston beds, referred to above, was the earliest record for the genus. The Western Australian examples carry the geological history of the genus back to the Upper Palæozoic.

Two New Species of Cretaceous Foraminifera.

By Walter Howchin, F.G.S.

[Read August 6, 1895.]

Plate X., figs. 9-13.

The southern limit of the great Cretaceous formations of Central Australia passes a little south of Hergott Springs on the main North line, 441 miles from Adelaide. At Hergott two bores, 150 yards apart, have been put down by the S.A. Government, and in No. 2 Bore a very strong artesian spring has been tapped. The beds passed through in these operations, and which in No. 2 Bore extend to a depth of 342 feet, appear to be of marine origin throughout. They consist of dark-colored mud shales and thin limestones. The section is only sparingly fossiliferous, and the foraminifera are relatively scarce. The material, however, being soft, and in a very fine state of division, can be easily reduced by washing and the microzoa concentrated. Fifty-six species in all have been noted from the bore material. A description of the microzoa of No. 1 Bore will be found in the Transactions of this Society, vol. VIII., p. 79; and a list of the foraminifera observed in No. 2 Bore has been given in "A Census of the Fossil Foraminifera of Australia," Aus. Ass. for Adv. of Science, vol. V., p. 362.

Haplophragmium australis, *sp. nov.* Pl. x., figs. 12-13.

Ref.—Haplophragmium australis, How., M.S., Report of Fifth Meeting of Aus. Asso. for Adv. of Science, Adelaide, 1893, p. 364.

Test free, elongate, crozier shaped; earlier chambers plano-spiral, later chambers linear. Spiral portion compressed, exca

vated at the umbilicus; periphery rounded. Linear portion cylindrical, or oval in transverse section, slightly increasing in size towards the oral extremity. Segments about ten in number, inflated. Sutural lines marked by deep incisions. Test coarsely arenaceous. Aperture simple, central; marked by umbo produced from central portion of final segment.

Length of large specimen, $\frac{1}{9}$ in.

This form differs from *H. agglutinans* (d'Orb.), with which it has close affinities, in the deep constrictions of the sutures, inflation of the chambers, and prominent oral features. The strongly-marked septation in the spiral portion gives an appearance to the chambers as though set at different angles, and thus opposed to each other in the plane of growth.

H. agglutinans is also present in the same beds, but no passage forms were noted between this last-named species and the one now described.

One example was found in No. 1 Bore at a depth between 100 ft. and 200 ft., and about half-a-dozen in No. 2 Bore at a depth of 50 ft.

PATELLINA JONESI, *sp. nov.* Pl. x., figs. 9-11.

Ref.—Patellina Jonesi, How., MS. Report of Fifth Meeting of Aus. Ass. for Adv. of Science, Adelaide, 1893, page 365.

Test free; superior lateral surface an elongated obtusely pointed cone; usually asymmetrical; inferior face flat or slightly concave; height equal to greatest breadth, or more; peripheral edge, obtuse, rounded. Segments, of which there are about seven on either side, cresentic (or ? annular); irregular both in size and position. Superior surface, punctured and minutely reticulated withl ines of clear shell substance. Septation often indistinct exteriorly, but sometimes marked by slight sutural depressions or swellings of the test in irregular gyrate elevations. Chamber cavities simple, undivided by septa. Central portion of test filled with irregular growth of shell substance, which also penetrates to a great extent the chamber cavities themselves.

Height of cone in average specimens, $\frac{1}{60}$ in.; diameter, $\frac{1}{70}$ in.

This is an anomalous little shell. It appears to be a *Patellina* of a very simple type. In external form it somewhat resembles the recent and very rare *P. campanæformis*, Brady, and still more closely the conical, Carboniferous form, *P. Bradyana*, Howchin, and is akin to both these species in its simple undivided chambers. But it differs from both the species referred to in the irregular form of its chambers and the generally diffused shelly deposits within the chambers as well as in the umbilical region. In the examination of minute fossil forms there is always a danger of confounding infiltration of mineral matter with the proper testaceous structure, but in the examination of transparent sections of this form it is often impossible to mark the distinc-

tion between the substance of the test walls and the confused shelly deposits,or even in some cases where the well-defined walls terminate and the irregular deposits begin. It would seem that the habit of the genus to produce secondary shell substance and irregular chamberlets has in the present species found its extreme development. The reticulated superficial layer appears to be a rudimentary form of "the external or reticulated chamber-layer," which is more definitely developed in the European Cretaceous species, *P. lenticularis*, Carter. The range of variation in the external form of this species is very considerable; at times it forms a symmetrical cone, but more frequently the habit of growth is marked by sudden inflation or contraction of the test as shown in fig. 9.

The geological range of the genus, so far as known, dates from the Carboniferous Limestone,* but it was during the Cretaceous and Eocene periods that it reached its greatest development, not only in size, but in the range of its species and the complex structure of its investment. Since the early Tertiary period it has gradually declined until in the present day it is only represented by one or two minute and degenerate species.

About a dozen examples were found in No. 2 Bore at Hergott, at a depth of 140-150 feet.

It is with much pleasure that I name the present species after J. W. Jones, Esq., Conservator of Water, under whose direction this very successful bore was carried out, and to whose courtesy and ready assistance I have been indebted for the material obtained from this as well as other Government borings.

EXPLANATION OF PLATE X.

Figs. 1-3.—CORNUSPIRA SCHLUMBERGI, *sp. nov.*

1. Lateral aspect.
2. Transparent, transverse section showing lamination of test walls.
3. Transparent, horizontal section showing irregular coiling of the chambers.

Figs. 4-6.—FRONDICULARIA WOODWARDI, *sp. nov.*

4. Opaque, lateral aspect. *a*. End view of same.
5. Opaque, lateral aspect of a short and broad variety.
6. Transparent, horizontal section.

Figs. 7, 8.—NODOSARIA IRWINENSIS, *sp. nov.* Lateral aspects of two average specimens.

Figs. 9-11.—PATELLINA JONESI, *sp. nov.*

9. Lateral view.
10. Transparent, vertical section.
11. Transparent, transverse section.

Figs. 12, 13.—HAPLOPHRAGMIUM AUSTRALIS, *sp. nov.*

12. Few-chambered specimen.
13. Example showing rectilineal growth. *a*. Oral view of same.

* Carboniferous Foram., by W. Howchin, Jour. Roy. Micro. Soc., Aug., 1888.

Further Notes on Australian Coleoptera, with Descriptions of New Genera and Species.

By the Rev. T. Blackburn, B.A.

[Read October 1, 1895.]

XVIII.

CARABIDÆ.

AGONOCHILA.

A. Koebelei, sp. nov. Breviter pubescens; picea, capite prothoraceque plus minusve rufescentibus, elytris fasciis 2 irregularibus valde contortis pallide testaceis ornatis, antennis palpis pedibusque testaceis; prothorace fortiter transverso, antice parum emarginato, crebre leviter minus subtiliter punctulato, lateribus fere æqualiter rotundatis bisetosis, angulis posticis fere rectis; elytris vix striatis, fere ut prothorax punctulatis. Long., $1\frac{1}{2}$ l.; lat., $\frac{4}{5}$ l.

This species may be readily distinguished by its small size and the unusual markings of its elytra. These latter consist of two strongly zigzag fasciæ the anterior of which is much wider than the posterior, its zigzags so strong as to extend from near the base of the elytra to considerably behind their middle. The posterior fascia is subapical. The markings bear a certain resemblance to those of *Eucalyptocola Mastersi*, Macl., but the two insects are very widely distinct.

N. Queensland; presented to me by Mr. Koebele.

A. stictica, sp. nov. Breviter pubescens; picea vel rufo-picea, antennis palpis pedibusque testaceis, elytris maculis testaceis senis elongatis (his longitudinaliter positis) ornatis; prothorace fortiter transverso, antice emarginato, leviter subtiliter (ad latera magis crasse) punctulato, lateribus bisetosis medium versus perspicue angulatis pone medium manifeste sinuatis, angulis posticis rectis; elytris vix striatis, subtilius sat fortiter sat crebre punctulatis. Long., $1\frac{3}{4}$ l.; lat., $\frac{4}{5}$ l.

Readily distinguished from the preceding structurally by the distinctly angulate sides of its prothorax. Very distinct from its previously described congeners by the markings of its elytra which seem to be quite constant though more or less conspicuous according as the ground-color is darker or lighter. They consist on each elytron of six testaceous elongate spots placed as follows:—One almost touching the base, two placed side by side about

the middle (the external one a trifle more anterior than the other), three near the apex placed side by side. In some examples the two middle spots just touch each other and in some the three subapical spots are slightly in contact with each other. In some examples the lateral border of the elytra is more or less pallid.

N. Queensland ; presented to me by Mr. Koebele.

SCOPODES.

S. intricatus, sp. nov. Breviter ovalis ; sat nitidus ; niger, capite prothorace que cupreis, elytris lineis subtilibus albis intricate reticulatim ornatis, antennis ferrugineis ; capite supra longitudinaliter striolato ; prothorace quam caput angustiori, supra fortiter striolato, haud canaliculato, fortiter transverso, latitudine majori longe ante medium posita, angulis posticis dentiformibus, lateribus mox pone marginem anticum fortiter angulatis hinc ad basin subrectis ; elytris striatis, interstitiis inæqualiter convexis (3° 3-foveolato). Long., $1\frac{3}{5}$ l.; lat., $\frac{7}{10}$ l.

Readily recognisable by the curious reticulation of fine white lines with which its elytra are ornamented ; also notable for the coarse striolation of its prothorax which distinguishes it from all its described congeners except *S. rugatus*, Blackb.; from this latter it is very distinct *inter alia* by its prothorax (even in the middle) scarcely being lobed or produced hindward behind a straight line joining the dentiform hind angles.

N. Queensland ; presented to me by Mr. Koebele.

STAPHYLINIDÆ.

BARRONICA (gen. nov. *Aleocharinarum*).

Myllænam simulans ; antennæ breves (his speciei typicæ quam prothoracis latitudo brevioribus) robustæ, articulis basalibus 2 sat æqualibus, 3° breviori et angustiori, 4° 5° que etiam brevioribus, 6°—10° ex ordine latioribus (8°—10° transversis), 11° longitudine 8°—10° conjunctis æquali ; caput in prothorace profunde immersum (superne haud præter naturam exsertum vix visibile) ; palpi maxillares modici, articulo apicali abrupte gracili ; prothorax semicircularis (fere ut *Corylophi*) transversus ; scutellum minutum ; elytra quam longiora fere duplo latiora ; abdomen pergracile, marginatum, a basi ad apicem fortiter angustatum (ut *Conuri*) ; pedes modici, tarsis anticis 4-articulatis, posterioribus 4 5-articulatis, posticis quam tibiæ vix brevioribus (articulo basali quam sequentes 3 vix breviori) ; coxæ inter mediis inter se modice disjunctæ.

I have unfortunately not been able to dissect a specimen successfully enough to ascertain all the characters satisfactorily and

so have had to omit some of them, but the characters specified above will enable this genus to be recognised readily. The minute insect on which it is founded is one of the most remarkable species I have seen and seems to have no near ally previously named, and I am in doubt where it should be placed. A casual glance would at once suggest placing it near *Myllæna* but its much shorter palpi and short stout antennæ seem inconsistent with such a place; I can however suggest no better. Its most remarkable character I think consists in the relation of its head and prothorax to each other which is almost exactly as in *Corylophus*, the small head being in repose laid back flat against the under-surface of the prothorax so as to be entirely invisible from above, and the outline of the prothorax being evenly semicircular so that there is no trace whatever of any front angles. The front part of the prothorax moreover is roundly declivous in front and when the head is laid back underneath projects freely over it exactly as in *Corylophus*. Another very notable character is found in the general form (which is an extreme exaggeration of that of *Myllæna*); the prothorax and elytra are exactly applied to each other so that their outline is perfectly continuous and forms a wide oval; the slender *Conurus*-like hind body looks like a thin tail and when it is raised upward the body has much the appearance of that of a miniature scorpion.

B. scorpio, sp. nov. Antice lata, depressa; nigra, antennis (apice infuscato excepto) flavis, pedibus piceis vel plus minusve sordide testaceis; subtiliter pubescens; prothorace ad elytra arcte applicato, his longitudine sat æquali, transverso, semicirculari, postice bisinuato, subtilissime punctulato, angulis posticis retrorsum productis; elytris quam longioribus fere duplo latioribus, subtiliter fere subaspere punctulatis, postice conjunctim late emarginatis, angulis externis retrorsum productis; abdomine minus subtiliter minus crebre punctulato, segmentis ad apicem setis elongatis instructis. Long., $1\frac{1}{5}$—$1\frac{1}{2}$ l.; lat., $\frac{2}{5}$ l.

N. Queensland; taken by Mr. Koebele in the Barron River District.

QUEDIUS.

Q. Koebelei, sp. nov. Minus gracilis; sat nitidus; niger, iridescens, ore palpis antennis pedibusque testaceis, elytris obscure ferrugineis apicem versus infuscatis; antennis sat brevibus sat robustis, articulo 3° quam 2us manifeste longiori 4° 5° que subæqualibus quam 3us paullo brevioribus, 6°—10° inter se sat æqualibus quam latioribus vix longioribus quam 5us manifeste brevioribus; capite fere transverso, quam prothorax paullo angustiori, puncturis 3 utrinque prope oculum et foveis magnis 2 (his transversim positis) inter antennarum

bases impresso; prothorace modice transverso, antice sat angustato, in disco puncturis 2 interse transversim approximatis ante medium (2que inter se late distantibus in margine antico) positis et utrinque marginem medium versus puncturis 2 transversim positis impresso; scutello elytris abdomineque minus fortiter minus crebre punctulatis; elytris prothoraci longitudine æqualibus. Long., 2 l (vix); lat., $\frac{1}{2}$ l.

This small species seems to be quite distinct from all the Australian *Quedii* hitherto described. In M. Fauvel's tabulation of *Quedii* (Ann. Genov. 1878, pp. 551-2) it would be placed I think beside *metallicus*, Fauv., from which *inter alia* its diminutive size readily distinguishes it. I must say, however, that M. Fauvel's tabulation is so complicated (being designed for interpolation with another tabulation) that I do not feel sure I understand it accurately. However, all previously described species except *piceolus*, Fauv., are markedly larger than the present insect, and *piceolus* differs from it *inter alia* by the apical portion of its abdomen being red.

N. Queensland; presented to me by Mr. Koebele.

METOPONCUS.

M. cairnsensis, sp. nov. Sat elongatus; nitidus; niger, antennis piceo-ferrugineis, elytris læte violaceis, pedibus et abdominis segmentis 1° 4° que læte rufis; capite elongato parallelo, quam prothorax sublatiori; hoc elongato, disco utrinque 4-punctulato; elytris biseriatim obsolete punctulatis, prothoraci longitudine sat æqualibus. Long., $2\frac{1}{2}$ l.

Readily distinguishable by its coloring from all the previously described species.

N. Queensland; taken by Mr. Koebele near Cairns.

PALAMINUS.

P. Novæ-Guineæ, Fauv. Mr. Koebele has sent to me from the Barron River district of Queensland some examples of a *Palaminus* which agrees very well with the description of this species. It is quite possible that a comparison with the type might reveal distinctions, but at any rate the two must be extremely close. The present insect does not appear to be the allied *P. Australiæ*, Fauv., of which I believe I have an example (taken in *Victoria*) differing from the Queensland specimens by the characters that M. Fauvel specifies as distinguishing *P. Australiæ* from *P. Novæ-Guineæ*.

P. vitiensis, Fauv. Among the *Staphylinidæ* taken in N. Queensland by Mr. Koebele I find an example of a *Palaminus* agreeing well with the description of this well-marked Polynesian insect. The only discrepancy is a slight one in respect of color;

whereas in *P. vitiensis* the "apex" of the elytra should be infuscate, in this specimen the infuscation is slightly in front of the apex, leaving the extreme apex of a pallid color.

PHALACRIDÆ.

In the Ann. Soc. Ent. Fr. 1893-4 occurs an important memoir in which M. Guillebeau revises this family and enumerates a number of new genera and species including several from Australia. The author distributes the family into ten sub-families. I regret that I have been unable to arrive at any very certain conclusions as to the identification of the various sub-families and genera. As regards the sub families, some of them appear to be distinguished *inter se* by very slight characters ; the *Olibromorphini* for instance are expressly stated to agree with the *Olibrini* in everything except in the metasternal process being shorter so as not to protrude beyond the intermediate coxæ. As regards the genera they are not recognisable with absolute certainty, no diagnosis being published and there being no indication of the characters beyond the few that the author makes use of in a tabulation of genera which he supplies. This tabulation, of course, only enables one to identify the genera on the assumption (a very large one) that all the species one is examining are referable to the genera named in M. Guillebeau's table.

I have before me a considerable collection of *Phalacridæ* gathered by Mr. Koebele and placed in my hands for identification. Owing to the very scanty characters attributed to Mr. Guillebeau's genera I am unable to refer any of the above mentioned specimens with certainty to any of those genera—but on the other hand there are none of those specimens which I can say with certainty do *not* belong to his genera. Under these circumstances the only possible course for me in describing Mr. Koebele's new species is to furnish a table of the genera which M. Guillebeau attributes to Australia arranged by his characters and apply to the species provisionally the names which that author employs, pointing out nevertheless that by this course I probably include under some of his names species which, if he had them before him, he would regard as requiring new generic names. The species described below, then, are divided into genera according to the following scheme, with the one exception indicated further on. I must remark however that the species which I refer to M. Guillebeau's sub-family *Olibromorphini* have the metasternum according to my observation protruding slightly beyond the intermediate coxæ, though not nearly so much protruding as the metasternum of those species which I refer to his *Olibrini*. I am disposed to think that this discrepancy is only a slight difference between his observation and mine because the species which have the metasternum short agree more or less

(some of them exactly) with the important tarsal characters that he indicates and because moreover if M. Guillebeau's description of the metasternum be held as rigidly accurate I should have to consider that I have not seen one of the *Olibromorphini* among all the numerous Australian *Phalacridæ* before me.

I cannot bring myself to think M. Guillebeau right in his treatment of *Litochrus;* I notice however an obscurity in his remarks which suggests the possibility of a printer's error. In his tabulation he distinguishes *Litochrus* from his new genus *Micromerus* by the former having the first joint of the posterior tarsi "very elongated," while the latter has it "two or three times as long as the second joint." Then he adds a note that in *Micromerus* the legs are probably less slender and the first joint of the tarsi less elongated than in *Litochrus* (which apparently he has not seen). But Erichson in characterising *Litochrus* merely says that the basal joint is longer than the second, and Lacordaire calls the second joint "a little" shorter than the first. This is a tangle which suggests the question whether in M. Guillebeau's note (quoted above) "less" may have been accidentally substituted for "more." I have in my collection an example from Tasmania which I have no doubt is *Litochrus brunneus*, Er., and its hind tarsi have their basal joint less than twice as long as their second joint. I have also some species from tropical Australia in which the basal joint is even more than three times as long as the second. It would not however be safe either to call these latter *Micromerus* or to give them a new name; consequently I must apply the name *Litochrus* to all the Australian *Olibrini* known to me.

A. Mesosternum visible only with the appearance of being a narrow scarcely prominent front margin to the metasternal lobe.
  B. Epistoma emarginate close to the eye.
    C. Metasternal lobe protruding beyond the intermediate coxæ (*Olibrini*).
      D. Basal joint of posterior tarsi very elongate ... *Litochrus*
      DD. Basal joint of posterior tarsi less elongate, but considerably longer than second joint ... *Micromerus*
    CC. Metasternal lobe less produced (according to M. Guillebeau not passing the intermediate coxæ) (*Olibromorphini*).
      D. Second joint of posterior tarsi much longer than basal joint... ... ... *Parasemus*
      (The other genera are not known to be Australian).
  BB. Epistoma not emarginate (*Phalacrini*).
    C. Elytra with a subsutural stria ... ... *Phalacrus*
    (No other genus recorded in Australia).
AA. Mesosternum well developed (*Eustilbini*).
  B. Apical joint of maxillary palpi not dilated; basal joint of hind tarsi not elongate ... ... *Phalacrinus*
  (No other genus recorded as Australian).

LITOCHRUS.

As explained above, I am obliged to refer to *Litochrus* provisionally, all the Australian species known to me presenting the characters of the group that M. Guillebeau has called "*Olibrini*." Nevertheless three of them (the first three described below) might with some reason be separated generically from the rest on account of the great slenderness of their hind tarsi, the great elongation of the basal joint of the same, and the greater projection beyond the intermediate coxæ of their metasternal lobe; the basal joint of their hind tarsi is longer than all the other joints together. None of the species previously described by me as *Litochri* exhibit these characters, but two of them (*L. suturellus* and *lateralis*) appear as noted below to fall into M. Guillebeau's new genus *Parasemus*.

L. coloratus, sp. nov. Ovalis; nitidus; rufus, prothoracis basa (anguste) elytrisque (apice sanguineo excepto) nigris; supri fere lævi (elytrorum stria suturali antice abbreviata excepta); metasterno medio sparsim setoso; tarsorum posticorum articulo basali quam ceteri conjuncti longiori. Long., $1\frac{3}{10}$ l.; lat., $\frac{7}{10}$ l.

The conspicuous coloring of this pretty species renders it easily recognisable. It is all but devoid of sculpture even near the apex (the sutural stria excepted). There are however some faint transverse scratches on the elytra visible only from certain points of view.

N. Queensland; taken by Mr. Koebele near Cairns.

L. pulchellus, sp. nov. Ovalis; nitidus; supra rufus, capite postice prothoraceque (lateribus exceptis) obscuris, elytris (lateribus anguste apice late et macula communi magna transversa rufis exceptis) nigris; capite prothoraceque sat lævibus; elytris fere lævibus (stria suturali antice abbreviata excepta) sed apicem versus obsoletissime punctulato-striatis; corpore subtus læte brunneo; metasterno medio rufo, sparsim punctulato, vix manifeste setoso (? exempli typici abraso); tarsorum posticorum articulo basali quam ceteri conjuncti longiori. Long., $\frac{9}{10}$—$1\frac{2}{5}$ l.; lat., $\frac{1}{2}$—$\frac{3}{5}$ l.

The conspicuous elytral markings render this also a readily recognisable species. The elytra may be thus described:—Red, bearing a large common black ring which touches the base, nearly touches the lateral margins and is considerably separated from the apex. The enclosed central space (owing to irregularity in the shape of the black ring) presents the appearance of two roundish spots confluent for some distance along the suture. The elytra are not marked with transverse scratches.

N. Queensland; taken by Mr. Koebele near Cairns.

L. noteroides, sp. nov. Ovalis; nitidissimus; totus pallide brunneo-testaceus; supra fere lævis, elytrorum stria suturali leviter impressa antice abbreviata; tarsorum posticorum articulo basali quam ceteri conjuncti longiori. Long., 1 l.; lat., $\frac{3}{5}$ l.

This species bears a certain resemblance in outline to a *Dytiscid* of the genus *Noterus*. It is smaller than *L. coloratus* and very different in color from both the preceding species. Its elytra show no trace of the transverse scratches that are characteristic of *L. coloratus*.

N. Queensland; taken by Mr. Koebele near Cairns.

L. Koebelei, sp. nov. Sat late ovalis; nitidus; testaceus; capite prothoraceque fere lævibus; elytris sat distincte punctulato-striatis, striis basin versus obsoletis et vix perspicue punctulatis, interstitiis subalutaceis et puncturis sparsissimis impressis stria suturali postice sat fortiter impressa; antennarum clava sat brevi sat lata. Long., 1 l. (vix); lat., $\frac{3}{5}$ l.

The uniform testaceous color, rather broad form, compact antennal club and distinct elytral sculpture of this species combine to render it easily recognisable.

N.S. Wales; taken by Mr. Koebele on the Blue Mountains.

L. tinctus, sp. nov. Ovalis; nitidus; testaceus, elytris basin versus indeterminate lineis macularibus fuscis notatis; capite prothoraceque subtilissime crebre sat distincte punctulatis; elytris ut prothorax punctulatis et puncturis paullo majoribus (his obsolete seriatim impressis et basin versus vix perspicuis) impressis, stria suturali postice minus fortiter impressa; antennarum clava sat brevi sat lata. Long., $1\frac{1}{10}$—$1\frac{1}{2}$ l.; lat., $\frac{7}{10}$—$\frac{9}{10}$ l.

This species seems to be near *Micromerus amabilis*, Guilleb., but is considerably larger and also differs *inter alia* by the line-like fuscous marks with which the basal part of the elytra is variegated. These marks seem to be always present though varying somewhat in intensity and never very sharply defined.

N. Queensland; taken by Mr. Koebele near Cairns.

L. major, Blackb. Ovalis; nitidus; niger subiridescens, capite antice prothoracis marginibus omnibus elytrorum lateribus (anguste) corpore subtus antennis palpis pedibusque testaceo-rufis; capite prothoraceque crebre subtiliter punctulatis; elytris seriatim subfortiter punctulatis, interstitiis dupliciter (sc. sparsius subtiliter et sparsissime subfortiter) punctulatis, stria suturali minus fortiter impressa; antennarum clava modica; hujus articulo basali leviter 2° sat fortiter transversis, apicali quam præcedens parum longiori. Long., $1\frac{4}{5}$ l.; lat., $1\frac{1}{10}$ l.

This species is notable for its large size. Its coloring also distinguishes it from all its Australian allies. I originally mentioned it as possibly a variety of the species I described as *Litochrus lateralis*, but it has good structural characters as will be seen by reference to my remarks on that species.

S. Australia.

The genus *Litochrus* (to which for reasons specified above I refer all the Australian *Phalacridæ* known to me having the hind tarsi elongated in proportion to the anterior tarsi and their basal joint considerably longer than the second joint) is now becoming so numerous that a tabular statement of the characters of its species seems called for.

A. Basal joint of hind tarsi longer than all the the other joints together.
  B. Elytra without transverse sculpture.
    C. Color entirely testaceous ... ... *noteroides*, Blackb.
    CC. Elytra with well-defined markings ... *pulchellus*, Blackb.
  BB. Elytra with transverse scratch-like sculpture *coloratus*, Blackb.
AA. Basal joint of hind tarsi shorter than all the other joints together.
  B. Elytra with defined markings.
    C. Elytra black with a common red spot ... *maculatus*, Blackb.
    CC. Elytra pale testaceous with black markings.
      D. Elytra with decided traces of numerous striæ ... ... *læticulus*, Blackb.
      DD. Elytra with only the sutural stria distinct ... ... *consors*, Blackb.
  BB. Elytra without defined markings.
    C. The largest punctures of the elytra are on alternate interstices ... ... *alternans*, Blackb.
    CC. Elytral puncturation not as "C."
      D. The elytral sculpture consists of rows of punctures,—not distinct striæ (except the sutural stria).
        E. These rows are almost entire and consist of strong punctures ... ... *major*, Blackb.
        EE. The rows fail in the anterior quarter of the elytra.
          F. The punctures in the rows, though fine, are strongly impressed (especially behind the middle)... ... *brunneus*, Er.
          FF. The punctures in the rows very faintly impressed throughout.
            G. Elytra piceous or reddish.
              H. Antennæ entirely testaceous ... *sydneyensis*, Blackb.
              HH. Antennœ with their club dark *frigidus*, Blackb.
            GG. Elytra testaceous.
              H. Form oval (elytra with indistinct short fuscous lines) ... ... *tinctus*, Blackb.
              HH. Form subhemispheric (Micromerus) ... ... *amabilis*, Guilleb.
      DD. Elytral sculpture not consisting of mere rows of punctures.
        E. Elytra with distinct punctulate striæ *Koebelei*, Blackb.
        EE. Elytra with faint impunctulate striæ *Palmerstoni*, Blackb.

PARASEMUS.

To the best of my knowledge no formal diagnosis of this genus has been published. The following characters are to be inferred from its place in two tabulations (Ann. Soc. Ent. Fr. 1894) :— Palpi of ordinary length, intermediate coxæ widely separated, mesosternum appearing only as the reflexed margin of the metasternal lobe, clypeus emarginate close to the eye and rounded at the apex, metasternal lobe not passing the intermediate coxæ, prosternal lobe not passing the front coxæ, antennal club three-jointed, second joint of posterior tarsi two or three times as long as basal joint, apical joint of maxillary palpi cylindric, a single subsutural stria, basal two joints of posterior tarsi not soldered together, posterior tibiæ obliquely truncate at the apex, form subhemispheric.

I have in my collection a number of species which must either be referred to this genus or be regarded as representing a new genus closely allied to it. They all agree more or less perfectly with the diagnosis of *Parasemus* that I have given above, their variations from it being in respect of characters that need not be regarded as generic ; thus the basal joint of the hind tarsi is in every instance notably shorter than, though in some instances it is more than *half* as long as, the second joint ; and the form of the body is by no means constantly subhemispheric, but this latter character (*i.e.*, the form of the body) is I think manifestly only specific. The character that I feel most doubtful about is "basal two joints of hind tarsi not soldered together." I am not sure that I understand this expression. In the insects before me the basal two joints are very closely connected and the suture (though perfectly manifest under a microscope) is very fine, but the two joints are certainly distinct from each other. A remarkable character common in a greater or less degree to them all consists in the compression and dilatation of the femora —especially the four anterior ones. These four might be called "subcircular" being almost as wide as long, the hinder margin of the intermediate being however not evenly rounded but feebly angular in the middle ; in repose the tibiæ are almost hidden under these flat plate-like femora only their apex protruding. As M. Guillebeau does not refer to the femora in *Parasemus* this character does not help me to determine whether my specimens are *Parasemi*.

I find that two species which I have previously referred to *Litochrus* must take their place among these present insects, viz., *L. suturellus*, Blackb., and *L. lateralis*, Blackb. At the time I described them the suture between the basal two joints of the hind tarsi escaped my notice and I mistook the two joints for a single one. I have now placed a hind tarsus of all the species in

my collection under a microscope so as to make sure of correctly ascertaining the structure. The two species which I described (Tr. Roy. Soc. S.A. 1892, p. 98) as probably members of a new genus near *Litochrus* and which I called *L.* (?) *alpicola* and *L.* (?) *uniformis* must also stand here and I think that which I called *Olibrus victoriensis* should be added.

P. torridus, sp. nov. Late ovalis; nitidus; supra piceus plus minusve rufescens; subtus, cum antennis palpis pedibusque, brunneo-testaceus; capite prothoraceque fere lævibus, elytris parte prope basin lævi excepta seriatim distincte punctulatis, puncturis in seriebus subtilibus et crebre dispositis, stria suturali (hac pone elytrorum medium incipienti) bene impressa, interstitiis vix manifeste punctulatis; antennarum clava sat elongata; hujus articulis 1° 2° que sat transversis intus quam extus multo magis dilatatis, articulo apicali quam præcedentes 2 conjuncti vix breviori. Long., 1 l.; lat., $\frac{4}{5}$ l.

This species bears considerable resemblance to *P.* (*Litochrus*) *suturellus*, Blackb., from which it differs *inter alia* by the large basal space devoid of sculpture on the elytra and by the sutural stria being altogether effaced on more than the anterior half of the elytra; also by the interstices of the elytral striæ being almost impunctulate, only the one or two nearest to the suture bearing any defined punctures.

N. Queensland; taken by Mr. Koebele near Cairns.

P. discoideus, sp. nov. Late ovalis; nitidus; supra rufo-piceus, prothoracis lateribus et elytrorum macula magna communi indeterminata basin attingenti multo dilutioribus; subtus cum antennis palpis pedibusque brunneo-testaceus; capite prothorace que fere lævibus, elytris (parte magna prope basin lævi excepta) seriatim distincte punctulatis, puncturis in seriebus subtilibus sat sparsim dispositis, stria suturali (hac pone elytrorum medium incipienti) sat bene impressa, interstitiis vix manifeste punctulatis; antennarum clava sat elongata; hujus articulis ut præcedentis. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l.

Smaller than the preceding and differently colored, also with the punctures in the elytral series a little finer and considerably less closely placed; the elytra are of a dark red or piceous color, the whole disc being occupied by a common somewhat heart-shaped blotch of a testaceous red color; this blotch is not sharply defined, touches the base, extends to within a short distance of the apex and spreads out laterally so as to be separated from the margin on either side by a dark space equal to about one-third of the width of an elytron. In certain lights the elytra of this

species show a rather distinct blue iridescence which is scarcely discernible in *P torridus*.

N. Queensland; taken by Mr. Koebele near Cairns.

P. doctus, sp. nov. Sat late ovalis; sat nitidus; capite prothoraceque rufis (hujus disco infuscato); elytris piceo-nigris, margine laterali (anguste) et macula communi discoidali bene determinata litteram V (late apertam) simulanti rufis; corpore subtus antennis palpis pedibusque sordide testaceis; capite prothoraceque sparsim sat distincte punctulatis; elytris (parte angusta prope basin lævi excepta) seriatim distincte punctulatis, puncturis in seriebus sat subtilibus sat crebre dispositis, stria suturali (hac longe ante elytrorum medium incipienti) sat fortiter impressa, interstitiis confertim subtilissime punctulatis; antennarum clava ut *P. torridi*. Long., $1\frac{1}{10}$ l.; lat., $\frac{4}{5}$ l.

This species is easily recognisable by the sharply defined red mark resembling a widely open V on the disc of the almost black elytra.

N.S. Wales; taken by Mr. Koebele on the Blue Mountains.

P. comes, sp. nov. Late ovalis; nitidus; supra piceo-niger, capite prothoracis lateribus elytrorum lateribus (anguste) et macula magna communi discoidali cordiformi bene determinata (hac marginem nusquam attingenti) rufis; subtus cum antennis palpis pedibusque testaceus vel brunneo-testaceus, metasterno medio sanguineo; capite prothoraceque sparsim sat distincte punctulatis; elytris seriatim distincte (prope basin vix perspicue) punctulatis, puncturis in seriebus sat subtilibus sat crebre dispositis, stria suturali paullo ante medium incipienti minus fortiter impressa, interstitiis sat distincte punctulatis; antennarum clava ut *P. torridi*. Long., $1\frac{3}{10}$ l.; lat., 1 l.

Resembles the preceding but apparently a good species; it differs chiefly by its larger size, broader build, and the fainter impression of the sutural stria which commences evidently further from the suture; also the red mark on its elytra is of very different form. Resembles also in general appearance *Litochrus maculatus*, Blackb.

N. Queensland; taken by Mr. Koebele near Cairns.

P. modestus, sp. nov. Late ovalis, postice subacuminatus; nitidus; totus brunneo-testaceus; capite prothoraceque fere lævibus, elytris (parte magna prope basin lævi excepta) seriatim distincte punctulatis, pone scutellum subgibbosis, puncturis in seriebus sat subtilibus minus crebre dispositis, stria suturali paullo ante medium incipienti sat fortiter impressa, interstitiis (illis versus suturam exceptis) vix per-

spicue punctulatis; antennarum clara ut *P. torridi.* Long., $\frac{4}{5}$ l.; lat., $\frac{2}{3}$ l.

Easily distinguishable by its entirely uniform pale brownish-testaceous color and extremely nitid appearance.

N. Queensland; taken by Mr. Koebele near Cairns.

P. obsoletus, sp. nov. Minus late ovalis; nitidus; supra fusco-piceus (nonnullorum exemplorum lateribus dilutioribus); subtus cum antennis palpis pedibusque brunneo-testaceus; capite prothoraceque vix perspicue punctulatis; elytris (parte magna prope basin lævi excepta) seriatim distincte punctulatis, pone scutellum subgibbosis; puncturis in seriebus subtilibus minus crebre dispositis, stria suturali paullo ante medium incipienti sat fortiter impressa, interstitiis vix perspicue punctulatis; antennarum clava ut *P. torridi.* Long., $\frac{4}{5}$ l.; lat., $\frac{1}{2}$ l.

This species is much like the preceding, apart from its very different color,—but when carefully examined its form is seen to be less broadly oval, the puncturation of its elytra considerably finer and its femora much less broadly dilated.

N. Queensland; taken by Mr. Koebele near Cairns.

P. internatus, sp. nov. Sat late ovalis; nitidus; supra piceo-niger, prothoracis lateribus obscure rufescentibus, subtus cum antennis palpis pedibusque rufo-testaceis; capite prothoraceque crebre subtilissime (vix perspicue) punctulatis, elytris (parte sat magna prope basin sublævi excepta) seriatim minus distincte punctulatis, puncturis in seriebus subtilissimis sat crebre dispositis, stria suturali sat longe ante medium incipienti, minus fortiter impressa, interstitiis subtiliter alutaceis; antennarum clava ut *P. torridi.* Long., $\frac{9}{10}$ l.; lat., $\frac{3}{5}$ l.

A species of very dark color on the upper surface, with the punctures in the elytral series excessively fine and faintly impressed. It is closely allied to the two preceding and best distinguished, I think, by inspecting it from the side, when the outline curve of its upper surface is seen to be much less curved (*i.e.*, part of a much larger circle) and to be *even*, whereas in the other two there is an evident unevenness of the curve due to a slight gibbosity a little distance behind the scutellum, the height of the elytra at that point being much greater than at the middle of their length.

S. Australia; Petersburg.

The following table shows the distinctive characters of the described Australian *Parasemi.* In this genus, it will be remembered, I include all the Australian *Phalacridæ* known to me having the characters of the *Olibromorphini* (as they are stated

above) and also having the second joint of the hind tarsi considerably longer than the basal joint.

A. Elytra without sharply defined markings.
  B. Form oval.
    C. Discoidal interstices of elytra with very inconspicuous (if any) puncturation.
      D. Sutural stria extending well into the front half of the elytra.
        E. The punctures in the elytral series more or less closely placed.
          F. Color of the upper surface more or less piceous or reddish-piceous.
            G. The elytral rows of punctures very fine throughout, and scarcely traceable in basal one-fifth of elytra.
              H. Elytra sub-gibbous behind the scutellum ... ... *obsoletus*, Blackb.
              HH. Elytra not sub-gibbous behind the scutellum ... ... *internatus*, Blackb.
            GG. The elytral rows of punctures much stronger (almost as in the European *Phalacrus caricis*, Sturm) and continued nearer base ... *suturellus*, Blackb.
          FF. Color uniformly very pale testaceous *modestus*, Blackb.
        EE. The punctures in the elytral series very fine and much more sparsely placed *discoideus*, Blackb.
      DD. Sutural stria scarcely reaching into the front half of the elytra ... ... *torridus*, Blackb.
    CC. Discoidal interstices of elytra with sparse well-defined puncturation about as strong as in the European *Phalacrus caricis*, Sturm.
      D. Elytra black ... ... *lateralis*, Blackb.
      DD. Elytra red ... ... *victoriensis*, Blackb.
  BB. Form subhemispheric.
    C. General color black ... ... *Grovellei*, Guillb.
    CC. General color ferruginous ... ... *uniformis*, Blackb.
  BBB. Elytra very broad at the shoulders and strongly acuminate behind ... ... *Alpicola*, Blackb.
AA. Elytra with sharply defined marking.
  B. The marking consists of a common heart-shaped spot ... ... *comes*, Blackb.
  BB. The marking resembles the letter V ... *doctus*, Blackb.

PHALACRINUS.

P. notabilis, sp. nov. Subrotundus, postice sat acuminatus; nitidus; supra piceo-niger, capite antice rufescenti, prothoracis (late) et elytrorum (anguste) lateribus rufis; corpore subtus antennis palpis pedibusque brunneo-testaceis, antennarum clava infuscata; capite prothoraceque subtilissime minus confertim punctulatis; elytris punctulato-striatis, striis suturam versus subtiliter latera versus fortiter impressis interstitiis distincte subtiliter nec crebre punctulatis; antennarum articulo basali valde dilatato, articulo

10° quam 9us sat breviori, apicali quam præcedentes 2 conjuncti vix breviori.

Var.? *dilutior*. Pallide brunneo-testaceus, elytris apicem versus picescentibus. Long., $1\frac{1}{10}$ l.; lat., 1 l.

Resembles *P. obtusus*, Blackb., in shape, but differs from it and from the other previously described species *inter alia* by the very deeply impressed lateral striæ of its elytra.

N. Queensland; taken by Mr. Koebele near Cairns.

P. comis, sp. nov. Subrotundus, postice sat acuminatus; nitidus; brunneo-testaceus, hic illic indeterminate obscurior; capite prothoraceque subtilissime sat sparsim punctulatis; elytris distincte subtiliter striatis, striis suturam versus subtiliter latera versus multo minus subtiliter punctulatis, interstitiis distincte minus crebre punctulatis; antennarum articulo basali sat dilatato, apicali quam præcedentes 2 conjuncti sat breviori. Long., $1\frac{1}{10}$ l. (vix); lat., $\frac{9}{10}$ l.

Resembles *P. obtusus*, Blackb., in shape and elytral striation but differs in the very well defined puncturation of its elytral striæ. *P. rotundus*, Blackb., has punctulate striæ but its striæ (especially the lateral ones) are very much more *finely* punctured and its shape is very different, being shorter and evidently more nearly circular.

Victoria; sent to me by Mr. French.

PECTINICORNES.

CERATOGNATHUS.

C. Gilesi, sp. nov. (Mas.) Elongatus, sat parallelus; crasse rugulose (in prothorace inæqualiter) punctulatis; niger, squamis adpressis aurantiacis sparsim vestitus; capite supra tuberculo mediano (hoc ad apicem vix bifido) instructo; mandibulis quam caput vix longioribus, in medio obtuse leviter auriculatis, ad apicem trifidis (lobo intermedio quam ceteri longiori); prothorace quam longiori fere dimidia parte latiori, antice sat angustato, longitudinaliter profunde sulcato; elytris irregulariter costatis, costis alternis quam ceteræ majoribus.

Feminæ mandibulis brevibus nec auriculatis. Long. (mands. incl.), 6—$6\frac{1}{4}$ l.

A very distinct species. Compared with *C. niger*, Westw., it differs by the form of the mandibles which are trifid at the apex (the three lobes all pointing in a direction continuing the length of the mandible) and in the male have a small obtuse elevation about the middle of their length (this elevation is much smaller and further from the base than the elevation on the mandibles of *C. Frogatti*, Blackb.); also differs from *C. niger* by its coarser

and less evenly distributed sculpture which is so disposed on the prothorax as to leave some large nitid protuberant spaces devoid of punctures, also by its prothorax being much less strongly transverse and being very evidently narrowed in front, also by there being only one frontal tubercle and the prothorax being deeply channelled down the middle, also by the elytra having about ten costæ, of which the alternate ones are the stronger (the somewhat coarse puncturation of the elytra not being interrupted by the costæ these latter are less conspicuous than they would be otherwise). The totally different sculpture of the prothorax *inter alia* distinguishes this species from *C. Westwoodi*, Thoms.

Victoria; in mountainous parts; taken by Mr. E. Giles.

CRYPTOPHAGIDÆ.

TELMATOPHILUS.

The following four species, although not very closely allied *as* species, seem to present no structural differences inconsistent with their being placed together generically. They are all subpentamerous clavicorns, and my own inclination was to refer them or at any rate most of them to the *Erotylidæ*. Feeling, however, some hesitation as so their true place I forwarded examples of the first described to my friend Dr. Sharp, of Cambridge, to whose obliging readiness in giving me his judgment I was already under many obligations. Dr. Sharp tells me that the specimens I submitted to him may certainly be treated as congeneric with the N. Zealand *Telmatophilus nitens*, Shp. He, however, points out that in this determination he does not differ much from my view of the matter as he regards the *Erotylidæ* and *Cryptophagidæ* as incapable of satisfactory distinction. There is no higher authority than Dr. Sharp, as all Coleopterists know; I consider myself very fortunate in having been able to obtain his opinion.

T. Sharpi, sp. nov. Oblongus; modice convexus; nitidus; setis subtilibus singulis minus elongatis e puncturis singulis orientibus vestitus; rufo-testaceus, capite prothorace et elytrorum plagis sat magnis nonnullis plus minusve infuscatis, exemplorum nonnullorum antennarum clava paullo infuscata; capite convexo sat æquali, cum prothorace sat fortiter vix crebre punctulato; hoc sat fortiter tranverso, antice vix angustato, ad basin late sublobato, ante basin transversim fortiter sulcato, lateribus sat arcuatis ante basin manifeste sinuatis, angulis posticis acute rectis; elytris leviter (striis lateralibus fortiter impressis exceptis) striatis, seriatim punctulatis, puncturis in striis crebris, interstitiis

lævibus (3° 5° 7° que sparsim seriatim punctulatis exceptis) antennis quam corporis dimidium brevioribus, articulo basali suborbiculari, 2° multo minori moniliformi, 3° quam 2us sat longiori, 4° ut 2us, 5° paullo longiori, 6°—8° ut 2us, 9° 10° que transversis sat latis, 11° quam 10us paullo longiori obovato; prosterno inter coxas sat lato utrinque carinato, postice producto, ad apicem truncato; oculis prominulis fortiter granulatis; metasterno ad latera grosse (in medio cum abdomine magis subtiliter) punctulato. Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

The infuscate blotches on the elytra are variable; in a well-marked specimen they consist of a large transversely quadrate or somewhat triangular common blotch at the base, a broad more or less straight median fascia and a large common apical blotch. In some examples the median fascia is dilated forward near the lateral margin, in others the median fascia is interrupted at the suture, and in others it does not reach the lateral margins. In some examples the dark markings on the elytra are nearly black and in others very little darker than the rest of the surface. The elytra of very dark examples are nearly black with a narrow pale fascia from either shoulder obliquely running towards the suture, and a pale spot on each elytron near the apex.

N. Queensland; taken by Mr. Koebele near Cairns.

T. Koebelei, sp. nov. Præcedenti (*T. Sharpi*) valde affinis; antennarum articulo 5° quam 4us 6us que haud perspicue longiori; prothoracis lateribus manifeste minus arcuatis; elytris (striis lateralibus exceptis) haud striatis, puncturis in seriebus multo minus crebre dispositis. Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l.

In addition to the structural characters set forth above this species differs from the preceding in the markings of its elytra, there being on each elytron a longitudinal prolongation of the median dark mark connecting the latter with the hind external corner of the basal blotch; this is not the case with any variety that I have seen of *T Sharpi*.

Queensland; taken by Mr. Koebele.

T. cairnsensis, sp. nov. *T. Sharpi* valde affinis; prothorace antice nullo modo angustato, minus crebre punctulato, lateribus fere rectis, elytris ut *T. Koebelei*. Long., $1\frac{3}{10}$ l.; lat., $\frac{1}{2}$ l. (vix).

Larger and of slightly wider build than *T. Sharpi* and with a very differently shaped prothorax. The markings differ in the basal and apical blotches of the elytra being very small, but as I have only seen a single example of this insect it is possible that this may be a mere variation.

N. Queensland; taken by Mr. Koebele near Cairns.

T. breviformis, sp. nov. *T. Sharpi* valde affinis; multo minus elongatus, magis crebre setulosus, antennarum articulo 5° quam 4us vix longiori, prothoracis lateribus paullo ante basin subangulatis hinc ad basin fortiter convergentibus, elytrorum interstitiis omnibus punctulatis. Long., 1 l.; lat., $\frac{2}{5}$ l.

The dark markings of this species are much like those of some specimens of *T. Sharpi;* they are however much reduced in size and intensity, so that each elytron is of a yellowish brown color with a dark patch about the scutellum an elongate longitudinal dark patch on the disc and a small apical dark patch. As each puncture on this, and all the preceding three, species bears a fine seta the interstices being much more punctulate involves the general surface being much more setulose.

N. Queensland; taken by Mr. Koebele.

T. stygius, sp. nov. Anguste oblongus; sat parallelus; sat convexus; nitidus; setis subtilibus minus perspicuis e puncturis singulis orientibus vestitus; supra niger; subtus piceus in medio rufescens; antennis pedibusque picescentibus, tarsis dilutioribus; capite prothoraceque fortiter vix crebre punctulatis; hoc sat transverso antice haud angustato, ad basin late sublobato, ante basin transversim fortiter sulcato, lateribus sat rectis; elytris vix (striis lateralibus exceptis) striatis, fortiter sat crebre seriatim punctulatis, interstitiis alternis sparsim vix perspicue punctulatis; antennis fere ut *T. Sharpi* sed articulo 5° quam 4us parum longiori; oculis et corpore subtus fere ut *T. Sharpi* sed metasterno medio et abdomine magis fortiter punctulatis. Long., $1\frac{1}{5}$ l.; lat., $\frac{2}{5}$ l. (vix).

Its black color and parallel build render this species easy to recognise.

N. Queensland; taken by Mr. Koebele.

T. singularis, sp. nov. Oblongus; sat convexus; sat nitidus; setis subtilibus e puncturis singulis orientibus vestitus; rufo-brunneus, antennarum clava infuscata; capite prothoraceque fortiter vix crebre punctulatis; hoc transverso, quam elytra sat angustiori, antice parum angustato, ad basin haud lobato, ante basin vix perspicue transversim sulcato, lateribus sat rotundatis crenulatis; elytris leviter (latera versus magis fortiter) striatis, striis crebre fortiter (interstitiis sparsissime) punctulatis; antennis fere ut *T. Sharpi* sed paullo breviori-bus, articulo 5° quam 4us vix longiori; corpore subtus fere ut *T. Sharpi;* oculis sat fortiter granulatis, sed quam *T. Sharpi* minus grosse. Long., 1 l.; lat., $\frac{2}{5}$ l.

Differing much from the preceding in facies (owing chiefly to its prothorax being narrower in comparison with the elytra and

being neither lobed nor strongly sulcate at the base), this species nevertheless seems less aberrant in *Telmatophilus* than they do, especially in respect of its less coarsely granulated eyes [these organs in the preceding are far more coarsely granulated than in European *Telmatophili* (*e.g.*, *T. caricis*, Oliv.)] and its tarsi of which the basal three joints are (as in *T. caricis*) a little longer and less closely packed together than in *T. Sharpi*, &c. It may be noted that none of the above species can be placed in the Australian genus *Cnecosa* which Mr. Pascoe associated with *Telmatophilus*, and from which *inter alia* they differ widely in the structure of their palpi.

N. Queensland; taken by Mr. Koebele.

LAMELLICORNES.

EUPŒCILA.

E. balteata, Vollenh. I have received from Mr. French examples which seem to agree well with the description and figure of this species. Mr. French reports them as taken in N. Queensland. It should be noted that the present insect does not appertain to *Eupœcila* as limited by Dr. Kraatz, but is I think clearly congeneric with *Schizorhina atripennis*, Macl., which Dr. Kraatz somewhat hesitatingly assigns to *Dilochrosis*.

EUCNEMIDÆ.

FORNAX.

F. coloratus, sp. nov. Sat nitidus; rufus, antennis (basi excepta) capite postice elytrisque (fascia lata postmediana excepta) nigris; pube brevi (hac in prothorace aurea in elytris nigra) densim vestitus; capite sat crebre (prothorace minus crebre, elytris sparsim) minus fortiter punctulatis; capite inter oculos subplanato in parte mediana leviter impresso, haud manifeste carinato; antennis quam prothorax longioribus, articulo 3° quam 2us plus quam duplo (quam 4us paullo) longiori; prothorace sat transverso, antice sat angustato, angulis posticis (superne visis) sat acutis, basi 4-impressa; elytris in partibus anticis duabus parum (apicem versus magis fortiter) angustatis, sat evidenter iridescentibus, vix manifeste (stria subsuturali excepta) striatis. Long., 6 l.; lat., $2\frac{1}{5}$ l.

Easily recognisable by its nitid, black, more or less iridescent elytra traversed immediately behind the middle by a broad testaceous red fascia. In M. de Bonvouloir's tabulation of *Fornax* [Ann. Soc. Ent. Fr. (4) X. part supp.] this fine species would find its place somewhere in the neighborhood of the Malayan *F. mirabilis*, Bonv., from which it differs *inter alia* by

its apical ventral segment not being acuminate and in the markings of its elytra.

N. Queensland; in the collection of Mr. French.

CURCULIONIDÆ.

CUBICORHYNCHUS.

C. taurus, sp. nov. Ovalis; postice abrupte declivis (fere perpendicularis); piceus, squamis fumicoloribus et aliis griseis intermixtis sat dense vestitus, capite confertim granulato, inter (sed fere pone) oculos granulis majoribus 2 instructo; rostro brevi crasso, cristis interocularibus subspiniformibus apice obtusis antrorsum plane directis insigni; prothorace modice transverso, sat crasse minus confertim granulato (vel fere tuberculato, granulis majoribus nonnullis latera versus in parte antica dispositis), linea subtili mediana impresso, lateribus sat æqualiter arcuatis, latitudine majori ante medium posita; elytris crasse nec profunde sulcato-foveatis, interstitiis angustis elevatis e granulis confertim positis formatis.

Maris tibiis posticis intus supra medium abrupte fortiter tumidis; metasterno postice et segmento ventrali basali sat profunde concavis; segmento ventrali apicali postice late rotundato.

Femina latet. Long. 5 l., lat., $2\frac{1}{5}$ l.

This species may be at once distinguished from its described congeners by the interocular crests (which usually resemble a prolongation hindward of the lateral margin of the rostrum) taking the form of short horn-like processes directed straight forward—*i.e.*, rising abruptly perpendicularly (but a little pointed outward) to the general surface. The setæ springing from the tubercles are of pale yellow color.

Lake Callabonna; taken by Mr. Zietz.

CATOCALEPHE (gen. nov. *Aterpidarum*).

Corpus convexum subparallelum setosum; rostrum modice elongatum, latum, depressum, ante basin gibbum, antice et in medio nitidum subglabrum sublæve, in partibus ceteris opacum rugulosum setosum; scrobes postmedianæ, infra rostrum directæ, antrorsum ut sulci laterales ad rostri apicem continuæ; scapus brevis, oculum haud attingens; funiculus 7-articulatus brevis crassus (articulo 1° quam ceteri paullo longiori), in clava adnatus; oculi parvi depressi subgrosse granulati; prothorax magnus transversim quadratus (parte antica summa angustata), quam elytra vix angustior lobis ocularibus fortiter spiniformibus; scutellum parvum; prosternum ante coxas sat elongatum; metasternum sat elongatum; coxæ anticæ contiguæ; pedes sat breves sat

robustæ; femora mutica; tibiæ flexuosæ, ad apicem bicalcaratæ, anticis extus crenulatis, posterioribus 4 externe fortiter denticulatis, posticarum corbulis cavernosis; tarsi lineares, unguiculis liberis simplicibus; abdominis segmentum 2um quam 3um 4um que conjuncta longius.

The species on which I found this genus is at once recognisable by the remarkable spiniform development of the ocular lobes. What are its affinities is a very difficult question. In general appearance it is remarkably like *Orichora* (figured by Mr. Pascoe Journ. Linn. Soc. X. t. 19, f. 3) but has nothing to do with it structurally. My inclination would be to associate it in the *Rhyparosomidæ* with *Mandalotus* (probably identical as I have already pointed out with *Dysostines*), but its comparatively long metasternum seems quite irreconcileable with such a place. I have therefore referred it to the tribe in which a strict observance of M. Lacordaire's tabulations would locate it and have associated it with the *Aterpides*. Certainly its rostrum is considerably like that of a *Rhinaria*, but some of the characters cited above (*e.g.*, the cavernous corbels of its hind tibiæ) are by no means suggestive of an *Aterpid*. Probably M. Lacordaire if it had been before him would have treated it as representing a distinct tribe. The peculiar scrobes of the rostrum call for special notice; a deep lateral sulcus runs from the apex of the rostrum hindward and somewhat behind the middle suddenly widens and is deflected to the under surface, the antennæ being inserted at the point of deflection.

C. minans, sp. nov. Convexa; sat parallela; sat brevis; picea, exemplorum nonnullorum pedibus elytrisque paullo rufescentibus; setis albidis subcrebre vestita; prothorace nitido, sat crebre sat fortiter nec rugulose (lateribus cum capite rugulose) punctulato, disco longitudinaliter anguste lævi subelevata; elytris minus nitidis, striatis, interstitiis sat crebre subgrosse granuloso-rugulosis; corpore subtus crebre squamoso-punctulato. Long. (rostr. incl.), $3-3\frac{3}{5}$ l.; lat., $1\frac{1}{5}-1\frac{2}{5}$ l.

Central Australia; taken by Mr. Zietz at Lake Callabonna.

PACHYURA.

P. minima, sp. nov. Suboblonga (postice latior); rufa, in parte vel tota picescens; supra squamis ochraceis vestita, his in capite prothoracque 3-lineatim in elytris 3-fasciatim minus perspicue condensatis; subtus dense æqualiter albido-squamosa (nihilominus in abdominis segmentis singulis,—apicali excepto,—utrinque macula parva denudata); rostro nigro nitido, usque ad antennarum basin squamoso et longitudinaliter carinato, fere lævi, ad apicem sat dilatato;

antennis præter prothoracis basin paullo attingentibus, articulo 3° quam 1us paullo longiori; prothorace cum elytris sat crebre granuloso-punctulato, transverso, antice angustato, lateribus leviter rotundatis; elytris obsolete striatis, ad apicem rotundatis, femoribus inermibus. Long. (rostr. incl.), 2—3 l.; lat., $\frac{3}{5}$—1 (vix) l.

I cannot ascertain that this extremely common little species has ever been described. I have little doubt that it is the insect named *P. australis* (but not described) by Mr. Hope as the type of the genus *Pachyura* and that the insect which Schönherr described as *P. australis*, Hope, was wrongly identified; the latter I have not seen from S. Australia whereas this little species is plentiful in the localities from which Hope obtained most of his insects. *P. minima* is a variable insect, its derm (including the legs and antennæ) ranging in color from red to pitchy black and the squamosity (which is coarse and seta-like) from pale to bright ochraceous. The squamosity is vaguely and sparsely dispersed over the whole upper surface except the apical part of the rostrum and in places is denser than elsewhere, this condensation of scales causing the appearance of an ill-defined pattern which consists of three lines running hindward from the level of the eyes to the base of the prothorax and three elytral fasciæ (subbasal, median, and subapical). It is however only in well preserved specimens that the elytral fasciæ are all distinguishable; average specimens give the appearance of elytra somewhat evenly squamose except in there being a semi-denuded space before and behind the middle. The sexual differences are not very marked; the males however are smaller and less robust than the females, and the rostrum in the former sex is slightly shorter than (while in the latter it is as long as) the head. The small size of this species is in itself a sufficient character to distinguish it from others previously described.

S. Australia; Victoria; N.S. Wales.

LONGICORNES.

PACHYDISSUS.

P. Frenchi, sp. nov. Piceus; pube sericea læte argentea densa interrupte vestitus; prothorace ad latera obtuse tumido, supra crasse ruguloso; elytris ad apicem oblique truncatis, partis truncatæ angulis spiniformibus; oculis supra modice approximatis, subtus late distantibus; spatio inter oculos subtus capillis subtilibus elongatis dense vestito, sat crebre punctulato, carina obtusa insigni transversim arcuata instructo; antennarum articulo basali crasse nec profunde ruguloso.

Maris antennis quam corpus multo longioribus; articulo 1° valde dilatato prothorace nullo modo attingenti, 2° brevi, 3° clavato quam præcedentes 2 conjuncti parum longiori, 4° clavato quam 3us paullo breviori, 5° leviter clavato 3° longitudine sat æquali, 6° sat gracili filiformi quam 5us dimidio longiori, 7° 8° que quam 6us manifeste longioribus supra longitudinaliter carinatis, ceteris (exempli typici) carentibus; segmento ventrali apicali ad apicem rotundato-truncato. Long., 17 l.; lat., $4\frac{4}{5}$ l.

Feminæ antennis quam corpus subbrevioribus filiformibus. Long., 16 l.

At once distinguishable from its described congeners by the beautiful bright silvery pubescence with which its upper surface is patchily clothed. It is also remarkable for the coarse but not very deep rugulosity of the basal joint of its antennæ which runs in transverse wrinkles. The underside of its head is like that of *P. picipennis*, Germ., except that the space between the eyes is divided from the space immediately in front of it (not by a sulcus but) by a curved carina.

N. Queensland.

NEOSTENUS.

N. spinipennis, sp. nov. (Mas.) Brunneo-piceus, antennis obscurioribus, elytris (marginibus anguste piceis exceptis) dilutioribus; antennis quam corpus paullo longioribus, articulis 5—10 quam *N. Saundersi* paullo magis fortiter serratis; prothorace quam longiori vix (quam *N. Saundersi* minus perspicue) latiori; elytris ad apicem suturalem spina valida (quam tarsorum articulus 3us vix breviori) armatis, ad latera profunde (quam *N. Saundersi* magis fortiter) excavatis, costis obsoletis (quam *N. Saundersi* multo minus distinctis). Long., 13 l.; lat., $3\frac{4}{5}$ l.

Very like *N. Saundersi*, Pasc., but easily distinguishable by the characters cited above, especially by the long stout spine at the sutural apex of the elytra.

Central Australia; taken by Mr. Zietz near Lake Callabonna.

PRAONETHA.

P. bimaculata, sp. nov. (Fem. ?) Fusca, dense fusco-pubescens, prothoracis maculis 2 magnis basalibus et elytrorum notula communi postmediana late V-formi piceis, spatio elytrorum inter suturam et costam ad suturam proximam in parte tertia postica longe testaceo-hirsuto; capite prothoraceque sat sparsim subtilius, elytris basin versus sparsim magis fortiter postice minus perspicue, punctulatis; prothorace antice et postice transversim impresso, modice transverso, supra minus inæquali haud tuberculato, lateribus sat arcuatis;

elytris postice haud abrupte declivibus, ad apicem obliquetruncatis, in disco tricostatis (et quoque costa 4ª exteriori leviter elevata, et 5ª versus apicem fere ut tuberculus elongatus manifesta), costa ad suturam proxima (ita ut cristæ 3 fasciculatæ appareant) divisa, disco granulis nonnullis parvis ornato; segmento ventrali apicali in medio nigro, linea subtili longitudinali mediana impresso; antennis quam corpus paullo brevioribus. Long., 6 l.; lat., $2\frac{2}{5}$ l.

This species belongs to Mr. Pascoe's seventh section of *Praonetha* (Tr. Ent. Soc. Lond. [3] III., pp. 180, &c.). It seems to be very distinct from all previously described species; the long testaceous pilosity clothing the sutural region in its hinder portion is a notable character; this pilosity is particularly conspicuous at the commencement of the posterior declivity where it is laid almost flat and directed outward as though combed from the suture over the hindmost of the crests. [A specimen of this species recently received from Mr. Cowley and taken by him near Cairns is somewhat smaller than the type and has snowy-white pubescence clothing a common space on the elytra a little behind the scutellum.]

N. Queensland.

CAIRNSIA (gen. nov. *Niphonidarum*).

Mas. Mandibulæ modicæ; caput breve, inter antennas parum concavum; antennæ quam corpus paullo longiores, subtus sparsim ciliatæ, articulo basali modico sat anguste piriformi, 3° quam 1ᵘˢ duplo longiori, 4° quam 3ᵘˢ vix breviori, ceteris ex ordine brevioribus; oculi fere divisi, fortiter granulati; prothorax longitudinaliter carinatus et sulcatus, antice ad latera nodosus (fere ut *Prosopli*); elytra antice longitudinaliter cristatus; pedes modici robusti, tibiis intermediis simplicibus, tarsis posticis quam tibiæ vix brevioribus; acetabula intermedia aperta; prosternum postice et mesosternum antice sat fortiter declivia sed haud perpendicularia, hoc antice nullo modo dentiformi nec producto postice late sat fortiter emarginato; segmentum ventrale basale ad apicem perlonge ciliatum; unguiculi divergentes.

Fem. Antennæ quam corpus paullo breviores; segmentum ventrale apicale longitudinaliter canaliculatom.

I am unable to refer the insect for which I propose this new name to any previously described genus. M. Lacordaire [Gen. Col. IX. (2) p. 521] divides the *Niphonides* into two groups distinguished by the greater or less emargination of the eyes. I think this genus must be placed in the former of these, in which it would fall beside *Hathliodes*; but it has not at all the facies of *Hathliodes* and differs structurally from the species of that

genus *inter alia* by its strongly crested elytra and by its wide mesosternum which is strongly emarginate behind. If it be regarded as belonging to the group with the eyes not quite "subdivided" it would have to take its place in the *Symphiletes* group in which it would be distinguishable *inter alia* by its prothoracic sculpture being (not transverse but) longitudinal together with the absence of tomentose depressions on the abdomen of the male. Its real affinity seems to me to be unquestionably with *Atyporis* and *Prosoplus* which it closely resembles in facies, but it differs from both in its mesosternum being in front neither perpendicular nor in the least produced or tuberculate. This latter character, together with the third joint of its antennæ not being perceptibly shorter than the fourth distinguishes it from *Menillus*.

C. Cowleyi, sp. nov, Picea, pedibus antennarum basi et elytris postice rufescentibus; obscure griseo pubescens, elytris ad basin pilis elongatis flavis (in cristis 2 positis) et in medio fascia irregulari maculari (hac e pilis nonnullis albidis nonnullis flavis formata) ornatis; capite prothoraceque sat crebre ruguloso-punctulatis; hoc transversim subquadrato, in medio late leviter sulcato, sulco carina mediana instructo; elytris a basi paullo ultra medium grosse ruguloso-punctulatis et granulatis, ad apicem rotundatis, parte apicali obsolete nec rugulose punctulata, disco obsolete 2- vel 3-costato, angulis humeralibus sat rectis. Long., 6 l.; lat,, $2\frac{2}{5}$ l.

A remarkable insect on account of the two short but strongly elevated longitudinal crests bearing long and dense yellow pilosity and placed one on either side of the scutellar region.

N. Queensland; sent to me by Mr. Cowley; also by Mr. French.

RHYTIPHORA.

R. Frenchi, sp. nov. (Fem.) Nigra, pilis niveis ornata, his in capite (ut linea oculos anguste, antennarumque articulos singulos late, cingens; et ut maculæ diversæ in genis mandibulis et clypeo positæ), in prothorace (ut lineæ transversæ 4 dorsales, his subtus dilatatis et prosterni totam superficiem vestientibus), in elytris (ut maculæ numerossimæ et vitta densa lata lateralis basin haud plane attingens) in sternis (partem medianum minus dense vestiente et in lateribus ut maculæ nonnullæ densæ condensatis), in abdomine (sat dense distributis sed maculis numerosis denudatis interruptis) et in pedibus (totam superficiem vestientibus) dispositis; capite sat grosse punctulato, vertice longitudinaliter canaliculato; prothorace rugulośo, transversim bisulcato; elytris sparsim pergrosse punctulatis, puncturis singulis penicillas singulas

adpressas niveo-pilosas ferentibus; antennis quam corpus paullo brevioribus. Long., 18 l.; lat., $6\frac{1}{2}$ l.

A very fine and distinct species; independently of the pattern of snowy white pubescence the elytra are glabrous; their pattern consists of a large number of isolated and very conspicuous white spots (resulting from the presence of pilosity in each puncture) and a broad lateral stripe of very dense pilosity commencing a little behind the shoulder and almost reaching the apex; the suture moreover is bordered near its apex by a narrow line of white pilosity. The system of markings is very much like that of *Penthea Saundersi*, Pasc., but in that species *inter alia* the patches of white hairs on the elytra are much larger and less numerous and there is no white lateral vitta; the eyes are very much more coarsely granulated in the present species and it is of narrower and more elongate form; these latter characters refer it to the genus *Rhytiphora*. The elytra are rounded at the apex. The prothorax has no lateral tooth and the elytra are devoid of basal granules.

N.W. Australia; in the collection of C. French, Esq.

EROTYLIDÆ.

EPISCAPHULA.

E. nigrofasciata, sp. nov. Oblonga; glabra; nitida; sat convexa; rufa, capite antennis pedibus (tarsis exceptis) prothoracis macula basali (hac antice bilobata) scutello elytrorum sutura maculis 3 (his circa scutellum et in humeris positis) fasciis 2 latis (altera mox ante medium altera sat longe pone medium positis) apice summo et margine laterali summo prosterni parte inter coxas mesosterno metasterno et abdominis segmentis basalibus 3 nigris; capite crebre punctulato; prothorace sat transverso, ad basin haud marginato, antice modice angustato, subtiliter sat sparsim punctulato et punctoris nonnullis sat magnis impresso (his ad basin et latera versus positis, in parte basali quam apicem versus multo majoribus et profundioribus), lateribus fere rectis,—elytris vix striatis, seriatim punctulatis (seriebus postice obsoletis, 2 discoidalibus quam ceteræ multo magis perspicuis); antennarum articulo 4° quam latiori manifeste longiori. Long., $3\frac{1}{5}$ l.; lat., $1\frac{3}{10}$ l.

This species is not unlike a variety of *E. australis*, Boisd., in which the median and post-median rows of spots coalesce into fasciæ, but differs as follows: the red coloring is lighter and more inclining towards a yellowish tone, the prothoracic spot is larger and is bilobed in front, the sides of the prothorax are straighter, the fine puncturation of the prothorax is more sparse and its

coarse punctures (instead of being of equal size and depth in all parts where they occur) are much larger and deeper near the base of the segment than near its apex.

Queensland.

E. brevicornis, sp. nov. Oblonga, postice acuminata; nitida; glabra; convexa; supra obscure rufa, capite prothoracis macula magna basali (hac fortiter transversa et antice 4-lobata) scutello et elytrorum maculis et fasciis (fere ut *E. nigrofasciatæ* dispositis, sed maculis basalibus in basi anguste conjunctis et fascia antica latiori ultra medium attingenti nec margines laterales attingenti) nigris; subtus nigra, prosterni lateribus et segmentis ventralibus ultimis 2 obscure rufis; antennis pedibusque (tarsis rufis exceptis) nigris; capite prothoraceque fere ut *E. nigrofasciatæ*, sed hujus puncturis majoribus inter se sat æqualibus; antennis sat brevibus, articulo 4° quam latiori haud longiori.

This species is at once distinguishable from the preceding and other species (including *E. australis*) by its shorter antennæ in which the fourth joint (instead of being markedly longer than wide) is quite as wide as long. The black mark on the prothorax occupies a little more than the middle one-third of the base and extends forward beyond the middle of the segment; it is deeply bilobed in front and near its front emits on either side a lobe-like process running obliquely forward and nearly reaching the lateral margin; the extreme front also of the prothorax is narrowly black. The prosternum in front of the coxæ is much more strongly convex (almost subcarinate) on the middle line than in the allied species.

N.S. Wales; taken by Mr. Froggatt near Maitland.

E. foveicollis, sp. nov. Oblonga; glabra; nitida; minus convexa; rufa, capite prothoracis maculis nonnullis (sc. macula basali, macula mox intra marginem lateralem medium utrinque posita, et marginis antici parte mediana) scutello elytrorum maculis fasciisque nonnullis (sc. maculis 3 transversim ad basin dispositis, fascia mox ante medium et altera pone medium postis, et apice sat late) antennis pedibus (tarsis exceptis) mesosterno metasternoque nigris; capite fortiter (parte mediana subtiliter) punctulato; prothorace sat transverso, antice parum angustato, subtilissime sparsius punctulato et puncturis nonnullis magnis (his inter se æqualibus, ad basin et latera versus, et præsertim utrinque in fovea magna prope angulos anticos, dispositis) impresso, lateribus parum arcuatis; elytris vix striatis, seriatim puuctulatis (seriebus postice obsoletis, 2 discoidalibus quam ceteræ multo magis perspicuis); antennarum articulo 4° quam latiori paullo longiori. Long., 4 l.; lat., $1\frac{1}{2}$ l.

At once distinguished from its allies by the conspicuous large and shallow depression a little within the anterior angles of the prothorax in which there is a cluster of very deep fovea-like punctures.

N. Queensland; taken by Mr. Koebele near Cairns.

THALLIS.

This genus is distinguishable from *Episcaphula* by, *inter alia*, the form of its prosternal process. In *Episcaphula* this process dilates behind the coxæ in the form of a flattened lamina widest at its hind margin which is triangularly emarginate. In *Thallis* (as at present constituted) the prosternal process is more variable but does not (at least in the Australian species) take the form specified above.

T. Macleayi, sp. nov. Oblonga; glabra; nitida; sat convexa; rufa, capite postice prothorace (lateribus exceptis) elytrorum parte circa scutellum fascia mediana et altera subapicali sternis in parte et abdominis maculis nigro-piceis; capite sat fortiter crebre punctulato; prothorace transverso, antice vix angustato, ad basin marginato, sparsim subtiliter punctulato puncturis majoribus confuse intermixtis, lateribus late incrassatis et intra marginem incrassatum longitudinaliter sulcatis; elytris vix striatis, seriatim punctulatis, seriebus postice minus obsoletis, interstitiis subtiliter punctulatis; processus prosternalis modice lati parte mediana convexa, apice rotundata), lateribus carinatis; antennarum articulo 3° quam 4us haud longiori. Long., 2½ l.; lat., 1 l.

Readily distinguishable from the others known to me of the genus by the broad thickened ridge-like margins of the prothorax (which are as wide as the basal joint of the antennæ is long) within which there is a deep narrow longitudinal furrow. It should be noted however that strictly speaking it is not the actual margin itself that is thickened for when the prothorax is closely examined there is seen to be a fine stria-like furrow dividing the true margin (which is normally narrow) from what is really a longitudinal ridge which to a casual glance seems to be an extension of the true margin.

N. Queensland; taken by Mr. Koebele near Cairns.

T. perplexa, sp. nov. Oblonga; glabra; nitida; sat convexa; rufa, capite prothorace scutello elytrorum parte circa scutellum fascia mediana et altera apicali (his in sutura anguste conjunctis) prosterno mesosterni metasternique lateribus antennis pedibusque (tarsis exceptis) nigro- vel rufo- piceis; capite sparsim sat fortiter punctulato; prothorace transverso, antice leviter angustato, ad basin marginato, fere ut caput punctulato, lateribus sat anguste incrassatis et intra partem

incrassatam longitudinaliter sulcatis; elytrorum sculptura ut *T. Macleayi* sed puncturis in seriebus paullo magis subtilibus; processu prosternali latissimo, parte mediana modice convexa postice rotundata, lateribus carinatis; antennarum articulo 3° quam 4us paullo longiori. Long., $2\frac{4}{5}$ l.; lat., $1\frac{1}{10}$ l. (vix).

As far as color and markings are concerned this species has all the appearance of being a slight and somewhat darkly colored variety of the preceding, differing chiefly in the legs and antennæ being darker, the sides of the prothorax dark and the black fasciæ of the elytra narrowly connected along the suture (the hinder one reaching the apex). But it is certainly a distinct species characterised by the sparse puncturation of its head and prothorax, the evidently fine seriate punctures of its elytra, the very much narrower incrassated space just within the true lateral margin of its prothorax, much greater width of its prosternal process, and the evidently greater length of the third joint of its antennæ.

Queensland.

T. subvinula, sp. nov. (Mas.) Oblonga; glabra; sat nitida; sat convexa; nigra; prothorace rufo, elytris maculis binis albido-flavis ornatis; subtus testacea; capite prothoraceque creberrime grossissime punctulatis, hoc linea lævi longitudinali angusta antice posticeque abbreviata instructo; elytris vix striatis seriatim punctulatis (puncturis in seriebus postice obsoletis), interstitiis minus distincte punctulatis; prosterno grosse punctulato, inter coxas sat late convexo, postice rotundato; antennarum articulo 3° quam 4us vix longiori; femoribus anticis subtus dente armatis; tibiis anticis curvatis. Long., $2\frac{1}{3}$ l.; lat., $1\frac{4}{5}$ l.

This species closely resembles *T. vinula*, Er., from which it differs as follows: the head and prothorax are very much more closely and coarsely punctured and the latter is a little more transverse (Erichson says that the prothorax of *vinula* is not shorter than wide, but this is not strictly accurate by measurement); the elytral punctures are decidedly stronger near the base; and the whitish markings on the elytra are smaller, being more abbreviated at both ends, so that they are spots rather than fasciæ.

S. Australia; Eyre's Peninsula.

T. (?) venustula, sp. nov. (Mas.) Oblonga; pubescens; sat nitida; sat convexa; rufa; capite, prothoracis macula transversa basali, scutello, elytrorum parte circa scutellum fascia latissima mediana sutura margine laterali apicalique, mesosterno, metasterno, abdominis segmentis basalibus 2, antennis

et femoribus, nigris, tibiis picescentibus ; capite grosse punctulato, in medio lævi ; prothorace transversim quadrato, antice haud angustato, ad basin marginato, fortiter subcrebre punctulato, marginibus lateralibus subcrenulatis ; elytris haud striatis, seriatim subtilius punctulatis, seriebus postice sat obsoletis, interstitiis seriatim subtiliter punctulatis ; prosterno ut *T. Macleayi ;* antennarum articulo 3° quam 4us paullo longiori ; femoribus anticis subtus ad basin profunde emarginatis ; tibiis anticis curvatis, ad apicem extus dentatis ; palpis maxillaribus magnis securiformibus.

Fem. latet. Long., 2½ l.; lat., 1 l.

Rather closely allied to *T. (?) insueta* from which it scarcely differs structurally ; it is however a much smaller insect, much more nitid, its markings much more sharply defined, its prothorax very much less closely punctured, the seriate puncturation of its elytra much less strong, &c., &c. The extraordinary formation of the front legs is no doubt sexual, as I find the front legs of *T. (?) insueta* similar in the male but normal in the female (except in the external dilatation of the apex of the tibia being common to both sexes).

Victoria.

T. (?) femoralis, sp. nov. (Mas.) Oblonga, sat parallela ; glabra ; minus nitida ; minus convexa ; rufa ; capite prothoraceque piceo-nigris, hoc latera versus dilutiori, scutello elytrorum parte circa scutellum fascia (hac mox antemedium posita) et macula apicali communi (nonnullorum exemplorum hac ad apicem vix attingenti) fere nigris ; corpore subtus hic illic infuscato ; capite prothoraceque grosse sat crebre punctulatis, hoc fere ut *T. venustulæ* (sculptura multo magis grossa excepta) ; elytris quam prothorax parum latioribus, distincte striatis, striis sat grosse punctulatis, interstitiis seriatim punctulatis, sculptura postice obsoleta ; corpore subtus grosse sat crebre punctulato (abdominis apicem versus magis subtiliter) ; processu prosternali lato postice minus prominenti rotundato-truncato, ad latera vix carinato ; antennarum articulo 3° quam 4us paullo longiori, clava minus lato ; femoribus anticis prope apicem subito angulatim angustatis ; tibiis anticis curvatis ad apicem extus leviter angulatim dilatatis.

Fem. pedibus simplicibus. Long., 3 l.; lat., 1 l.

This species seems to be an isolated one. Its sexual characters are much like those of *T. compta*, Er., but the facies of that insect is very different on account of its much more nitid appearance, less strong puncturation, prothorax smaller in proportion to the elytra, antennæ shorter with a more defined club.

Tasmania.

T. (?) *dentipes*, sp. nov. (Mas.) Oblongo-elongata; sat parallela; glabra; nitida sat convexa; rufa; capite, prothoracis parte postica, scutello, elytrorum angulis humeralibus fascia mediana (suturam haud attingenti) et fascia subapicali (marginem lateralem haud plane attingenti), prosterni parte postica, mesosterno, antennis, coxis anterioribus 4, et pedibus, nigris vel nigro-piceis; capite sparsim subtilius punctulato; prothorace vix transverso, antice haud angustato, margine antico antrorsum rotundatim producto, ad basin marginato, subtilius minus crebre punctulato, lateribus fere rectis; elytris vix striatis, seriatim punctulatis, seriebus postice sat obsoletis, interstitiis vix perspicue punctulatis; processu prosternali sat convexo, postice rotundato, lateribus vix carinatis; antennarum articulo 3° quam 4us paullo longiori, clava sat lata; femoribus anticis subtus prope apicem dente forti armatis, tibiis anticis fortiter curvatis. Fem. latet. Long., $2\frac{1}{2}$ l.; lat., $\frac{7}{10}$ l.

A very elongate parallel species, easily recognisable by its markings and by the sexual characters of the male.

Victoria.

As the known Australian species of *Thallis* are now somewhat numerous it seems desirable to attempt a tabular statement of their distinctive characters. In the following attempt I have been obliged to rely upon color and markings more than I could wish on account of there being species unknown to me in nature the descriptions of which do not contain satisfactory information relating to structural characters. In the following table the names in italics are of species which I have placed from a study of their descriptions merely.

A. Upper surface glabrous.
  B. Elytra with a pattern of variegated colors.
    C. Elytra black or piceous around the scutellum.
      D. Prothorax more or less red.
        E. Margins of prothorax normal.
          F. Prothorax entirely bright red.
            G. A wide flat unpunctured space down middle of prothorax ... vinula, *Er.*
            GG. The unpunctured space obsolete (*i.e.*, narrow, raised, and much abbreviated, at both ends ... subvinula, *Blackb.*
          FF. Prothorax partly black or piceous.
            G. Legs black ... ... compta, *Er.*
            GG. Legs red ... ... femoralis, *Blackb.*
        EE. Margins of prothorax widely incrassated within the lateral margin ... Macleayi, *Blackb.*
      DD. Prothorax entirely black.
        E. Prothorax very finely punctulate ... *bizonata*, Macl.
        EE. Prothorax strongly punctulate ... perplexa, *Blackb.*
    CC. Elytra without dark coloring round the

scutellum ... ... dentipes, *Blackb.*
BB. Elytra unicolorous ... ... janthina, *Er.*
AA. Upper surface pubescent.
B. Prothorax more or less red.
C. Median black fascia of elytra wide and straight.
D. Prothorax very closely punctulate ... insueta, *Crotch.*
DD. Prothorax much less closely punctulate venustula, *Blackb.*
CC. Median fascia narrow and zigzag ... ... *Erichsoni*, Crotch.
BB. Prothorax entirely black ... ... *bifasciata*, Crotch.

ENDOMYCHIDÆ.

CRANTEROPHORUS (gen. nov.).

Caput modicum antice modice elongatum; labrum emarginatum; mandibulæ ad apicem bispinosæ; labium fortiter transversum antice emarginatum (partis emarginatæ angulis externis spiniformibus); palpi maxillares modici, articulo ultimo oblongo subcylindrico; palpi labiales breves, articulo ultimo quam longiori triplo latiori antice truncato; mentum ante basin lateraliter utrinque spiniforme; oculi magni prominuli grosse granulati; antennæ sat graciles quam corporis dimidium longiores, articulo basali subpiriformi, 2° parvo, 3° quam præcedentes 2 sublongiori quam 4us 5us que conjuncti vix breviori (hoc quam illo sublongiori), clava sat lata 3-articulata (hujus articulis basalibus 2 intus elongatis acutis, apicali ad apicem truncato); prothorax transversim subquadratus, quam elytra duplo angustior, antice profunde emarginatus, ad basin profunde transversim (et utrinque breviter longitudinaliter) sulcatus; prosternum intercoxas angustissimum, postice vix prominens; mesosternum sat planatum postice angustatum; pedes sat elongati; unguiculi simplices; tarsi subtetrameri, articulo 2° sat brevi; corpus glabrum.

Type *Mycella clavicornis*, Blackb.

In describing the species for which I propose this new name I referred it doubtfully to *Mycella* remarking that the structure of its tarsi is not consistent with a place in that genus. I have since obtained more specimens and have been able to make a proper examination with the result that I find it must stand as the type of a new genus. The internal dilatation and angulation of the joints nine and ten of its antennæ together with the lateral angulation of its mentum suggest alliance with the South American *Epipocus* which it considerably resembles in facies. In Dr. Chapius' tabulation of his groups of *Endomychidæ* its characters place it in the *Epipocites*. In his tabulation of the genera of that Groupe it stands beside *Epipocus* from which it is separated *inter alia* by the strong basal sulcus of its prothorax.

STENOTARSUS.

The following two species may I think be attributed to this genus, which has not been previously recorded as Australian. As however they are both unique in my collection I have not been able to make a complete examination of their mouth organs. In respect of the other characters they agree well with Dr. Chapuis' lengthy diagnosis, the only discrepancies I observe being that the surface of the prothorax is not marked with longitudinal furrows (there is a wide deeply concave space on either side immediately within the sub-lateral carina, but I do not think this is what Dr. Chapuis refers to) and that the basal ventral segment is (though fully as long as the following *three* segments together) scarcely as long as the following *four* together.

S. arithmeticus, sp. nov. Ovalis; sat nitidus; pilis subtilibus erectis sat dense vestitus; rufus, capite prothorace antennis pedibus (tarsis exceptis) et in elytris notis binis (sc. macula discoidali figuram 2 simulanti mox ante mediam posita et macula ovali subapicali) nigris; prothorace quam longiori plus quam duplo latiori, sparsissime punctulato, sat longe intra marginem carina longitudinali instructo et intra carinam profunde longitudinaliter concavo; elytris sparsim sat fortiter punctulatis et marginem versus foveis sat magnis (his seriatim positis et prope apicem deficientibus) impressis; antennis sat crassis, quam corporis dimidium paullo brevioribus. Long., $1\frac{4}{5}$ l.; lat., $1\frac{1}{10}$ l.

The mark resembling on one elytron the figure 2 (on the other the same reversed) immediately in front of the middle of each elytron renders this species easy to recognise.

Victoria.

S. commodus, sp. nov. Breviter ovalis; sat nitidus; pilis subtilibus erectis sat dense vestitus; rufus, prothorace metasterno antennis (basi excepta) femoribus et in elytris notis nonnullis (sc. macula magna communi subrotundata mox pone scutellum posita et macula sublaterali magna difformi paullo ante medium posita) nigris; prothorace fere ut præcedentis sed quam longiori triplo latiori; et antice magis angustato; elytrorum puncturis ut præcedentis sed lateribus magis rotundatis; antennis ut præcedentis. Long., $1\frac{4}{5}$ l. (vix); lat., $1\frac{1}{5}$ l.

Apart from the very different coloring and markings this insect differs from the preceding by its very evidently shorter and broader form as well as by its considerably more transverse prothorax which is more narrowed in front.

Australia. I do not know the exact habitat.

PERIPTYCTUS (gen. nov.).

Caput modicum, antice minus elongatum; labrum antice late rotundatum; palporum maxillarium articulus ultimus ovalis, labialium crassus; antennæ sat graciles, quam corporis dimidium breviores, 11-articulatæ, articulo basali fortiter dilatato, 2° multo longiori et multo graciliori, 3° 4° que minutis, 5° elongato (quam præcedentes 2 conjuncti longiori), 6° minuto, 7° paullo longiori, 8° minuto, 9°-11° clavam elongatam (quam 5us-8us conjuncti sublongiorem) formantibus, 11° ad apicem truncato; oculi sat grosse granulati; prothorax transversus, a basi antrorsum angustatus, antice sat emarginatus, intra marginem brevi distantia obtuse carinato, mox intra carinam profunde longitudinaliter concavo, ad basin haud sulcato; elytra ovalia, ad basin vix quam prothorax latiora; scutellum fortiter transversum; prosternum antrorsum (ut *Elateridarum*) valde elongatum ad oris receptionem elongatum, inter coxas latum, postice productum, ad apicem truncatum, inter coxas et in parte postica utrinque subtiliter carinatum; mesosternum latum antice declive; abdominis segmentum basale ceteris conjunctis longitudine æquale; pedes sat graciles; tarsi subtetrameri, articulo 2° modice elongato; unguiculi simplices; corpus setis subtilibus sparsis sat elongatis vestitum.

I do not know of any previously described genus of *Endomychidæ* in which the prosternum is produced anteriorly as a "chin piece" to cover entirely the mouth organs in repose, although the character is by no means wanting among the Australian *Coccinellidæ*. The nearest approach to it that I can find in an *Endomychid* is in the diagnosis of *Cremnodes* where the prosternum is said to be "prolonged towards the mouth." The present species however could not well be placed near *Cremnodes;* working by Dr. Chapuis' tabulations of *Endomychidæ* one would have to place it in the *Lycoperdinites* beside *Coniopoda*. Its antennæ are almost as peculiar structurally as is its prosternum.

P. russulus, sp. nov. Ovalis; minus convexus; brunneo-rufus, prothoracis disco infuscato; sparsim sat subtiliter punctulatus, puncturis in elytris subseriatim dispositis. Long., 1 l.; lat., $\frac{3}{5}$ l.

Victoria; on a small fungus in rotten wood in the Alpine District.

IDIOPHYES (gen. nov.).

Caput modicum, antice minus elongatum; labrum antice late rotundatum; palporum maxillarium articulus ultimus elongatus sub-cylindricus ad apicem acuminatus, labialium magnus subquadratus; antennæ quam corporis dimidium

breviores, robusti, 10-articulatæ, articulo basali sat crasso subpiriformi, 2° quam basalis vix angustiori subgloboso, 3°-7° multo gracilioribus filiformibus, 8°-10° clavam sat latam formantibus (8° vix, 9° sat fortiter, transversis, 10° quam præcedentes 2 conjuncti sat breviori); oculi sat grosse granulati; prothorax valde transversus, antice paullo angustatus leviter emarginatus, longe intra marginem lateralem carina longitudinali instructo, trans basin fortiter sulcato; scutellum scutiforme; elytra breviter ovalia sat fortiter convexa; prosternum inter coxas sat angustum, postice vix productum; mesosternum sat latum, postice angustatum; abdominis segmentum basale quam sequentia 3 vix longius; pedes sat graciles; tarsi subtetrameri, elongati, articulis inter se æquilatis, articulo basali quam 2us tarsorum anticorum breviori posticorum longiori; unguiculi simplices; corpus setis gracilibus sat elongatis minus crebre vestitum.

The antennæ of the insect on which I found this genus having only ten joints and its comparatively long and slender tarsi render it easy to identify. I think it is clearly allied to *Lycoperdina* but as I have seen only one example I have not been able to investigate one or two characters that its place in Dr. Chapuis' tabulation depends upon; *e.g.*, I cannot satisfy myself as to whether its prosternum projects slightly or not at all clear of the front coxæ.

I. brevis, sp. nov. Breviter ovalis, postice acuminatus; sat convexus; setis subtilibus suberectis elongatis fulvis minus crebre vestitus; fulvus, palpis pedibusque dilutioribus; prothorace quam longiori triplo latiori, parte laterali sparsim distincte punctulato, parte discoidali fere lævi angulis posticis rectis, basi quam elytrorum basis vix angustiori; scutello distincte punctulato; elytris substriatis, striis subfortiter minus crebre punctulatis. Long., 1 l. (vix); lat., $\frac{3}{5}$ l.

Victoria.

ELEOTHREPTUS (gen. nov.)

Caput modicum antice modice elongatum; labrum late leviter emarginatum; mandibuli ad apicem bifidi; palporum maxillarium et labialium articulus penultimus fortiter dilatatus, ultimo magis angusto elongato-subconico; antennæ quam corporis dimidium breviores, sat validæ, 11-articulatæ (articulo basali modico subpiriformi, 2° parvo, 3° longiori, 4° paullo breviori, 5°-8° inter se sat æqualibus quam 4us parum brevioribus, clava compacta obovata suturis inter articulos vix distinctis); oculi sat grosse granulati; prothorax fortiter transversus, æqualis, antice sat angustatus subtrun-

catus; scutellum triangulare; elytra late ovalia subdepressa, quam prothoracis basis ad basin vix latiora; prosternum inter coxas sat latum, postice truncatum vix productum; mesosternum transversum antice rotundato-truncatum; abdominis segmentum basale quam cetera conjuncta vix brevius; pedes modici; tarsi subtetrameri, articulis basalibus 2 brevibus, apicali valde elongato; unguiculi simplices; corpus setis suberectis subtilibus minus elongatis sat crebre vestitum.

This is a remarkable little insect, of facies decidedly aberrant in the *Endomychidæ* but certainly belonging to that family I think, by the structure of its mouth organs and its tarsi. It has a certain resemblance, on a casual glance, to the *Trogositid* genus *Thymalus*, though it is of much less convex form—and of course with no structural affinity thereto.

E. punctulatus, sp. nov. Late ovalis; minus convexus; setis suberectis vestitus; brunneo-fulvus, capitis prothoracisque parte mediana elytris et (plus minusve) corpore subtus infuscatis; capite prothoraceque distincte sat crebre, elytris dupliciter (sc. subtiliter et fortiter) minus crebre, punctulatis; prothorace quam longiori plus quam duplo latiori; elytris nec striatis nec seriatim punctulatis. Long., 1 l.; lat., $\frac{7}{10}$ l. (vix).

S. Australia; on a fungus on marshy ground near Port Adelaide.

DYSCERASPHORUS (gen. nov.)

Caput magnum, antice parum elongatum; labrum minutum; palporum maxillarium articulus ultimus elongato-ovalis ad apicem acuminatus, labialium lato transverso; antennæ breves, quam corporis dimidium multo breviores, 6-articulatæ (clava haud inclusa), articulo basali 2° sat æquali, 2° quam 3us paullo longiori, 3°-6° inter se sat æqualibus, clava triangulari quam articuli ceteri conjuncti paullo breviori haud distincte articulato fortiter dilatato; oculi parvi grossissime granulati; prothorax fortiter transversus, æqualis, antice angustatus et fortiter sinuatim emarginatus; scutellum parvum; elytra subcuneiformia, epipleuris subhorizontalibus antice latis; prosternum inter coxas sat angustum, postice paullo dilatatum et leviter productum, ad apicem truncatum; mesosternum breve transversum, antice declive; abdominis segmentum basale quam sequentia 3 conjuncta vix longius; pedes modici; tarsi subtetrameri, articulis basalibus 2 inter se sat æqualibus (ultimo quam basales 2 conjuncti subbreviori); unguiculi simplices; corpus glabrum, convexum.

This genus is a very isolated one in the *Endomychidæ* to which

its structure seems clearly to refer it. Its antennæ with only seven joints (or nine if the club be regarded as three-jointed; I cannot however satisfy myself that it is of more than one joint) render it very easy to recognise. In general appearance it bears some resemblance to species of the *Erotylid* genus *Euxestus*. The excessively coarse granulation of its small eyes is a notable character.

D. laticeps, sp. nov. Convexus; brevis; nitidus; rufo-brunneus; supra subtiliter (minus perspicue) sat æqualiter sat crebre punctulatus. Long., $\frac{4}{5}$ l.; lat., $\frac{1}{2}$ l.

N. Queensland; taken by Mr. Koebele near Cairns.

COCCINELLIDÆ.

EPILACHNA.

E. Terræ-reginæ, (? *E. guttato-pustulatæ*, Fab., var. nov.). Late ovalis; pubescens; brunneo ferruginea, prothorace ad latera flavescenti; hoc crebre fortius sat æqualiter, elytris dupliciter (*i.e.*, fere ut prothorax sed paullo minus crebre, et grosse sparsim), punctulatis. Long., 4 l.; lat., 3 l.

At once distinguishable from all its described congeners of Australia and adjacent places by its uniform red-brown color. It appears to me to be quite possibly an extreme var. of *E. guttato-pustalata*, but in any case it seems desirable that even as a variety it should bear a distinctive name.

N. Queensland; taken by Mr. Cowley, near Cairns.

CŒLOPHORA.

C. nigro-vittata, sp. nov. Late ovalis; flavo nigroque variegata; colore nigro in prothorace (ut linea basalis angulatim bis dilatata et macula discoidalis papilionis figuram simulans), in elytris (ut margo integer, vittæ 3—his a sutura discedentibus ex ordine magis elongatis, et macula subapicalis) in epipleuris (ut margo externus), in corpore subtus toto (nonnullorum exemplorum prosterni abdominisque parte excepta), et in pedibus (nonnullorum exemplorum his nihilominus, femoribus posticis exceptis, flavis) disposito; prothorace crebre distincte, elytris magis fortiter minus crebre, punctulatis; prosterno medio planato, antice acuminato, vix perspicue bicarinato; metasterno antice truncato. Long., $2\frac{1}{2}$ l.; lat., $2\frac{1}{5}$ (vix) l.

The bright yellow surface, marked on the elytra with three discoidal black vittæ, renders this species easily recognisable among its congeners. None of the vittæ are quite joined to the black color of the base; the first vitta is near and parallel to the suture and does not extend much beyond the middle of the

elytra; the second runs obliquely from the humeral callus towards the suture (not however reaching it), extends to about a quarter the length of the elytra from the apex, and in some examples is interrupted a little behind the middle of the elytra; the third also commences on the callus and runs (parallel to the lateral margin) to the neighborhood of the apex. The vitta are variable in their breadth and in some examples have a much more sinuous outline than in others. The prosternal foveæ in this species are extremely well defined.

N. Queensland; taken by Mr. Koebele near Cairns.

CYCLONEDA.

C. barronensis, sp. nov. Late ovalis, postice subacuminata; flavo nigroque variegata; colore nigro in prothorace (ut linea transversa apicalis et macula bifida basalis), in elytris (ut margo integer, macula basalis discoidalis, fascia lata mediana, et fascia lata postmediana,—nonnullorum exemplorum fasciis interruptis), in epipleuris (totis macula elongata pone humeros excepta), in corpore subtus toto (abdomine,—segmenti basalis parte mediana nihilominus nigro,—excepto) et in pedibus (horum anticorum femoribus subtus tibiis tarsisque, intermediorum tibiis tarsisque, posticorum tarsis, flavis) disposito; antennis quam capitis (oculis inclusis) latitudo paullo longioribus, articulis ultimis 2 intus sat dilatatis, apicali ad apicem truncato; clypeo antice vix emarginato; oculis sat fortiter granulatis; prothorace fortiter transverso, antice paullo angustato, crebrius subtilius punctulato, antice bisinuatim sat fortiter emarginato, marginibus parum arcuatis; elytris magis fortiter minus crebre punctulatis. Long., 2 l,; lat., $1\frac{3}{5}$ l.

The following characters refer this species to the genus *Neda* (as characterised by Dr. Chapuis, Gen. Col., vol. XII.):—Head free, base of antennæ free, epipleuræ without distinct foveæ, body glabrous, antennæ of 11 joints, abdominal lamellæ well-defined, base of elytra gently emarginate all across, antennæ comparatively long, prosternum without a lateral fovea, scutellum normally large. I am a little doubtful to which of Dr. Chapuis' subgenera it belongs (Crotch seems to think they should be regarded as valid genera), but on the whole it is most suitably placed I think in *Cycloneda (Daulis*, Muls.). It is a very pretty and conspicuous species. The black and yellow coloring of the upper surface are so mingled that it is difficult to say which should be regarded as the color of the derm. If it be regarded as black, the yellow markings are, a fascia on the prothorax narrowest in the middle where it does not reach into the basal half of the prothorax (at the actual middle however it has an angular

projection hindward which slightly widens it) and widening out laterally to occupy the whole of the lateral margins, on each elytron (*a*) a yellow mark roughly resembling a figure 3 with its base towards the suture and its points towards the base of the elytra not quite touching the margin anywhere (*b*) an elongate transverse patch (constricted in its middle) a little behind the middle of the elytra and (*c*) an oval spot close to the apex. In some examples the intermediate (*b*) yellow mark is connected in its middle by a slender line with the subbasal mark and (more broadly) at its inner extremity with the subapical mark. The black markings (regarding the derm color as yellow) are described in the Latin diagnosis above.

N. Queensland; taken by Mr. Koebele near the Barron River.

NEDA.

N. bicolor, Blackb. Mr. Koebele obtained in N. Queensland two specimens which I attribute to this species and which (if I am right in doing so) show it to be subject to considerable variation. One of these two examples has the prothorax widely bordered with yellow; the other is considerably larger than the type (long., $3\frac{1}{2}$ l.) and also differs in having a large faintly defined reddish blotch immediately behind the base, and close to the external margin, on each elytron. I can find no other differences than those I have noted, but as it is possible that the examination of more specimens may prove the larger example to represent a distinct species I will call it var. ? *picturata*.

ORCUS.

O. Lecanii, sp. nov. (Mas.). Subhemisphæricus; sat fortiter convexus; subtiliter minus crebre (quam *O. Australasiæ*, Boisd., paullo magis perspicue sed haud multo aliter; quam *O. Lafertei*, Muls. minus subtiliter multo magis perspicue; quam *O. punctulatus*, Blackb., multo minus crebre vix minus fortiter; quam *O. chalybeus*, Boisd., paullo minus crebre minus fortiter) punctulatus; supra obscure nigro-viridis vix auratus (labro et prothoracis margine antico testaceis exceptis); subtus (antennis palpis pedibusque inclusis) testaceis; prothorace ad latera strigoso-ruguloso; elytris ad latera minus reflexis (fere ut *O. Australasiæ*); clypeo ad latera fortiter laminato (fere ut *O. Australasiæ*); prosterni lateribus et elytrorum epipleuris foveolatis. Long., $2\frac{1}{5}$ l.; lat., 2 l.

Fem. prothorace antice vix testaceo-marginato; elytris minus perspicue punctulatis. Long., $2\frac{2}{5}$ l.; lat., $2\frac{1}{5}$ l.

The distinctness of the puncturation on the upper surface in the *Orci* seems to depend chiefly on the nature of the derm which

in some species is smoother than in others and shows the puncturation more conspicuously. In the present species the derm in the male example before me is very lævigate and consequently the puncturation very distinct while in the female the derm is quite coriaceous and consequently the puncturation very obscure. This species differs from all its previously described congeners by its coloration, and also from *chalybeus* by the much greater width of the dilated side pieces of its clypeus; from *cyanocephalus cœlestis* and *punctulatus* by its much less strongly impressed elytral puncturation, from *Lafertei* by its less convex form, and from *Australasiæ*, *bilunulatus*, *splendens*, *ovalis*, and *nummularis* by the presence of foveæ on the elytral epipleuræ.

N. Queensland; taken by Mr. Koebele; feeds on *Lecanium depressum*.

O. obscurus, Blackb. This insect which I described as a var. ? of *Australasiæ* is a good species as I find that its elytral epipleuræ have a small distinct fovea, which I overlooked when I was writing the description.

LIPERNES.

L. gibbosus, sp. nov. Late ovalis; valde convexus; sat nitidus; piceo-niger, vix æneo-micans; pube cinerea sat dense vestitus; subtiliter sat crebre punctulatus. Long., $\frac{9}{10}$ l.; lat., $\frac{7}{10}$ l. (vix).

Very close to *L. subviridis*, Blackb., but differing from it in the almost complete absence of an æneous tone of color and in its much greater convexity, which is most noticeable if the insect be looked at from the side when the length of the elytra is seen to be not much greater than their height; whereas in *subviridis* the length is not much less than twice the height.

N. Queensland; taken by Mr. Koebele.

L. creber, sp. nov. Late ovalis; valde convexus; minus nitidus; piceo-niger; pube cinerea sat dense vestitus; crebre sat fortiter punctulatus. Long., $\frac{3}{5}$ l.; lat., $\frac{1}{2}$ l.

Resembling *L. gibbosus* in form this species differs from its described congeners by its very small size and the close strong puncturation of its surface.

N. Queensland; taken by Mr. Koebele in the Cairns District.

GYMNOSCYMNUS.

G. explanatus, sp. nov. Fere circularis; valde convexus; nitidus; niger, elytris maculis binis magnis rufis ornatis, capite rufotestaceo antennis palpis pedibusque plus minusve rufescentibus, nonnullorum exemplorum corpore subtus rufescenti; supra crebrius subtiliter (latera versus et in prothorace magis fortiter) punctulatus; prothorace fortiter transverso,

hujus basi quam elytrorum basis vix angustiori; elytris ad latera late explanatis; sternis et abdominis segmento basali in parte mediana sparsim distincte punctulatis.

Var. maculis in utroque elytro conjunctis, sicut apparet vitta lata discoidalis. Long., $\frac{4}{5}$ l.; lat., $\frac{4}{5}$ l.

Very like *G. 4-maculatus*, Blackb., but *inter alia* having the head red, the prothorax more strongly punctulate and the lateral margins of the elytra much more strongly explanate. The epipleuræ of the elytra at their widest part are not much less than half as wide as the whole metasternum.

N. Queensland; taken by Mr. Koebele near Cairns.

PLATYOMUS.

When I characterised *Scymnodes* I had not seen *Platyomus*, but concluded that it was distinct because one of the generic characters assigned to the latter is "mesosternum carinate." Having since obtained examples of *Platyomus* I have felt obliged to regard the two genera as identical and to believe that the mesosternal carina is merely a specific character. I can find no other character whatever to distinguish *Scymnodes difficilsi*, Blackb., generically from *Platyomus* than the absence of that carina. As to the number of joints in the antennæ it is possible that my observation is at fault (although the antennæ of *S. difficilis* still appear to me only ten-jointed). But as Mulsant and Chapuis were unable to agree as to the joints in the antennæ of *Platyomus* (Mulsant counting them as ten) I do not consider this character reliable. I think therefore that *Scymnodes* should be treated as a synonym of *Platyomus* and the carination of the mesosternum (which after all is not at all strongly marked in *Platyomus lividigaster*) cease to be regarded as a generic character.

The structure of the claws in *Platyomus* (including *Scymnodes*) calls for remark. These are stated to be "appendiculate" in all the generic diagnoses. The basal piece of each claw is compressed and ends in a point directed downward. But in the males of all the species of which I have seen this sex the apical piece of the four anterior claws is very close to the basal piece and is of the same length as the downward directed point of the latter, so that these claws appear to be bifid rather than appendiculate. The males are also distinguishable by the fifth ventral segment being emarginate or at least sinuate behind.

A remarkable character of *Platyomus* consists in the great size and unusual form of the piece that should be called, I believe, the metasternal lamella. From the inner hindmargin of the middle coxa the hind suture of the piece runs obliquely and almost straight to the suture that separates the metasternum from its

episternum and reaches it scarcely in front of the middle of the episternum. This structure seems to associate these insects with *Rhizobius*. The genus *Platyomus* (as I understand it) is, then, distinguishable by the following characters:—Body pubescent; epipleuræ not foveolate; eyes not coarsely granulated nor placed obliquely; antennæ of medium length; metasternal lamellæ very large and of the form described above; abdominal lamellæ small and complete; middle of prosternum forming a raised flattened space limited on either side by a fine carina; mesosternum large and conspicuous narrowed from the front hindward (its front margin emarginate, its surface flattened, and carinate or not); claws appendiculate (the anterior subbifid in the male). It will be seen from the above that the only structural characters I can find reliable to separate *Platyomus* from all the species at present standing in *Rhizobius* are the form and granulation of the eyes, and the sexual character of the claws.

P. cribratus, sp. nov. (Mas.) Sat late ovalis; sat convexus; pilis albidis brevibus erectis sat dense vestitus; sat nitidus; piceo-niger; capite prothorace (basi media excepta), antennis palpis et abdominis parte apicali rufescentibus; capite sparsim subtilius, prothorace crebre subtilius, elytris crebre dupliciter (sc. subtiliter et subgrosse) punctulatis; puncturis in elytris nec versus latera nec versus apicem ullo modo minus concinne impressis; elytris pone humeros ad latera fortiter rotundato-dilatatis; mesosterno carinato; unguiculis anterioribus 4 subbifidis. Long., $1\frac{3}{5}$ l.; lat., $1\frac{1}{5}$ l.

The distinguishing characters of this species are the strong dilatation of the sides of its elytra behind the shoulders, the mixture of fine and course punctures on its elytra (in both which it agrees with *S. Koebelei*, Blackb.) and the uniform distribution on the elytra of these punctures which do not become feebler or less deep or close towards the sides and apex. This latter character distinguishes it from *S. Koebelei*, of which moreover the prothorax is black. The puncturation of the elytra also is throughout closer than *S. Koebelei*.

N. Queensland; taken by Mr. Koebele near Cairns.

P. baccæformis, sp. nov. (Fem.) Breviter late ovalis; valde convexus; sat nitidus; pilis albidis brevibus erectis sat dense vestitus; testaceo-rufus, elytris (margine laterali et apicali latis exceptis) prosterni parte mediana meso- et metasternis et abdominis parte mediana basali piceis; capite sparsim subtilius, prothorace crebre subtilius, elytris dupliciter (sc. subtiliter et sat fortiter) punctulatis; puncturis in elytris latera apicemque versus subobsoletis; elytris pone humeros ad latera fortiter rotundato-dilatatis; mesosterno

haud carinato; unguiculis omnibus appendiculatis. Long., $1\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Near. *S Koebelei* but certainly distinct, differing widely from it in color. The present species, moreover, is shorter and broader than *S. Koebelei* and much more strongly convex, so that looked at from the side its greatest height is considerably more than half its greatest length. The post-humeral dilatation of the elytra and their puncturation are not much different from those of *S. Koebelei* but the elytral puncturation is a trifle less strong. From the bright coloring and great convexity of this insect I should have expected it to be a male, but it seems to be certainly a female.

N. Queensland; taken by Mr. Koebele near Cairns.

P. (Scymnodes) Koebelei, Blackb. In this species the mesosternum is not carinate and the anterior four claws are subbifid in the male, the intermediate less markedly so than the front ones.

P. (*Scymnodes*) *immaculatus*, Blackb. (Mas.) Sat late ovalis; sat convexus; pilis albidis brevibus erectis sat dense vestitus; piceo-niger, capite antennis palpis pedibus anticis femorum intermediorum basi tarsis abdomine et prothoracis angulis anticis summis testaceis; capite sparsim subtilius, prothorace crebre subtilius, elytris dupliciter (sc. subtilius et sat grosse), punctulatis; puncturis in elytris latera apicemque versus obsoletescentibus; elytris pone humeros ad latera fortiter rotundato-dilatatis; mesosterno haud carinato; unguiculis anterioribus subbifidis. Long., $1\frac{7}{10}$ l.; lat., $1\frac{2}{5}$ l.

This is the insect which I originally called "var.? *immaculatus*" of *Koebelei*. The inspection of a second specimen together with two more of *P. Koebelei* has satisfied me that it is a good species. Besides the color differences I find that the elytral puncturation of *immaculatus* is distinctly closer than of *Koebelei*.

N.S. Wales; taken by Mr. Koebele near Gosford.

P. (*Scymnodes*) *fulvohirtus*, Blackb. (Mas.) Breviter late ovalis; valde convexus; pilis albido-fulvescentibus brevibus erectis sat dense vestitus; totus piceo-niger, antennis abdomineque testaceis exceptis; capite prothoraceque crebre minus subtiliter, elytris dupliciter (sc. subtilius et sat grosse) punctulatis; puncturis in elytris latera apicemque versus paullo minus fortiter impressis; elytris pone humeros minus fortiter rotundato-dilatatis; mesosterno haud carinato; unguiculis anterioribus subbifidis. Long., $1\frac{3}{5}$ l.; lat., $1\frac{2}{5}$ l. (vix).

This is the insect which I originally called "var.? *fulvohirtus*" of *Koebelei*. The material now before me however satisfies me that it is a distinct species. Besides great difference in color it

is distinguished from *Koebelei* by its much more closely punctured head, the less dilatation of the sides of its elytra, the stronger emargination of its fifth ventral segment, and its shorter and more convex build.

Queensland; taken by Mr. Koebele near Toowoomba.

P. (*Scymnodes*) *Eugeniæ*, Blackb. (Fem.) I take this to be probably the female of *P. immaculatus*, Blackb. It differs from the male of that species in its darkly colored head and front coxæ, in its anterior claws not being subbifid and in its fifth ventral segment being rounded behind. I originally considered it a possible var. of *P. Koebelei.*

P. consimilis, sp. nov. (Mas.) Sat late ovalis; minus convexus; pilis albidis brevibus erectis sat dense vestitus; piceo-niger, elytris macula magna apicali sanguinea ornatis, antennis palpis tibiis anticis et tarsis omnibus rufescentibus, abdomine rufo-testaceo; capite crebrius subtilius, prothorace crebrius paullo magis fortiter, elytris sat crebre sat fortiter sat æqualiter, punctulatis; elytris pone humeros ad latera sat fortiter rotundato-dilatatis; mesosterno haud carinato; unguiculis anterioribus subbifidis.

Fem. vix differt nisi segmento ventrali 5° haud emarginato et unguiculis omnibus appendiculatis. Long., $1\frac{3}{5}$ l.; lat., $1\frac{3}{10}$ l.

This species is very much like *S. Koebelei*, but differs from it in a number of characters; it is of less convex form (viewed from the side the summit of the outline curve is at the middle of the insect in *Koebelei* but considerably behind the middle in *consimilis*); the apical spot on its elytra is much larger; its head is much more closely punctulate; its elytra are much more evenly punctulate there being little or no difference *inter se* in the size of the punctures, all of which are as large and strong as the coarser punctures in *Koebelei.*

Queensland; taken by Mr. Koebele.

P. obscuricollis, sp. nov. (Mas.) Ovalis (minus late); sat convexus; pilis albidis (exempli typici vix fulvescentibus) brevibus erectis sat dense vestitus; piceo-niger, prothoracis macula magna utrinque posita antennis abdominisque parte apicali fulvis; capite crebrius subtilius, prothorace crebrius paullo magis fortiter, elytris dupliciter (sc. subtiliter et sat fortiter) sat crebre, punctulatis; elytrorum puncturis apicem versus magis fortiter impressis; elytris pone humeros ad latera fortiter rotundato-dilatatis; mesosterno haud carinato; unguiculis anterioribus leviter subbifidis. Long., $1\frac{4}{5}$ l.; lat., $1\frac{2}{5}$ l.

In the unique example of this insect the markings of the prothorax (perhaps variable) are most easily described if the fulvous

tint be regarded as the ground color. The black then appears as a triangle its base occupying the whole base of the segment and its apex on the middle of the disc, but from the apex the black coloring is narrowly produced forward and then dilates again along the front margin of the prothorax and is very narrowly returned along the lateral margins to join the basal black portion. The species is also notable by the coarsest puncturation of its elytra being placed near the apex, and by the sexual structure of the anterior claws being less pronounced than is usual in the genus—the apical piece of those claws being markedly longer than the projecting process of the basal piece; nevertheless the claws in question are evidently different from the hind ones. The prothorax is much less brightly colored than in the other species with markings on that segment.

Among the *Coccinellidæ* of Mr. Koebele's Queensland Expedition is an example which seems to be the female of this species. Apart from the ordinary sexual characters in the claws and fifth ventral segment I do not find any difference from the male type except in the elytral puncturation being very much closer and finer. I find nothing analogous in any other species of the genus—the females not being (so far as my observations go) punctured differently from the males. But instances of abnormal puncturation are not very rare among the Australian *Coccinellidæ* and I am disposed to regard this as probably an instance of that kind.

N. Queensland; taken by Mr. Koebele near Cairns.

P. terminalis, sp. nov. (Fem.) Sat late ovalis; sat convexus; pilis albido-fulvis brevibus suberectis sat dense vestitus; piceo-niger, prothoracis lateribus antennis palpis tibiis tarsis abdomineque (hoc in parte basali mediana infuscato) testaceis, elytrorum apice summo sanguineo; capite sparsim subtiliter, prothorace subtiliter vix magis crebre, elytris crebre minus subtiliter, punctulatis; elytris pone humeros ad latera modice rotundato-dilatatis; mesosterno haud carinato; unguiculis omnibus appendiculatis. Long., $1\frac{3}{5}$ l.; lat., $1\frac{1}{5}$ l.

The coloring of this species scarcely differs from that of *P. lividigaster*, Muls., except in the tibiæ being all decidedly testaceous, the middle of the abdomen blackish at the base and the extreme apex of the elytra sanguineous. From *lividigaster* it differs *inter alia* by its mesosternum not carinate and the much closer and decidedly less coarse puncturation of its elytra, but is certainly a near ally of that species.

N. Queensland; taken by Mr. Koebele near Cairns.

P. lividigaster, Muls. I have not seen a male of this species, and I should judge from his description that Mulsant had only the female before him. The two females that have come under my notice are both from N.S. Wales.

The following tabular statement will probably assist in distinguishing the species of this genus :—

A. Mesosternum not carinate.
  B. Prothorax of uniform (or nearly so) piceous color.
    C. Apex of elytra sanguineous.
      D. Puncturation of head sparse.
        E. Lateral border of elytra widely sanguineous ... ... *baccæformis*, Blackb.
        EE. Apex only of elytra sanguineous ... *Koebelei*, Blackb.
      DD. Puncturation of head close ... ... *consimilis*, Blackb.
    CC. Apex of elytra not sanguineous.
      D. Head sparsely punctured... ... ... *immaculatus*, Blackb.
      DD. Head closely punctured ... ... *fulvohirtus*, Blackb.
  BB. Prothorax with a large testaceous or fulvous blotch on either side.
    C. Apex of elytra sanguineous.
      D. Elytra æneous ... ... *difficilis*, Blackb.
      DD. Elytra pitchy black ... ... *terminalis*, Blackb.
    CC. Elytra of uniform piceous color ... ... *obscuricollis*, Blackb.
AA. Mesosternum carinate.
  B. Prothorax red (or with only some basal infuscation) ... ... *cribratus*, Blackb.
  BB. Prothorax piceous, a large pallid blotch on either side ... ... *lividigaster*, Muls.
  BBB. Prothorax uniformly piceous or black ... *Forestieri*, Muls.

SCYMNUS.

S. operosus, sp. nov. Ovalis ; sat nitidus ; pube albida vestitus, hac inæqualiter distributa (i.e. hic et illic ut maculæ vel fasciæ condensata); niger, antennis palpis tibiis tarsisque flavis ; crebre subtilissime punctulatus ; prosterno medio longitudinaliter depresso ; spatio depresso sat lato antrorsum leviter angustato antice obtuso utrinque subtiliter carinato ; lamellis abdominalibus haud integris ; sutura postice subtiliter carinata. Long., 1 l.; lat., $\frac{3}{5}$ l.

This species is recognisable by its entirely black upper surface with white pubescence arranged in patches; these form a narrow more or less interrupted lateral border which emits a branch from below the shoulders running about halfway across the elytron and another behind the middle of zigzag form running interruptedly to the suture. In my tabulation of *Scymnus* (Tr. R.S., S.A., 1892, pp. 248, &c.) the present species falls beside *S. simplex*, Blackb., from which its color and the peculiar arrangement of its pubescence at once separate it.

Queensland ; taken by Mr. Koebele in several localities.

S. brisbanensis, sp. nov. Ovalis ; sat nitidus ; pube albido-fulvescenti vestitus ; niger, prothorace ad latera et elytris apicem versus dilutioribus, antennis palpis tarsisque flavis ; crebre subtilissime punctulatus ; prosterno medio longi-

tudinaliter depresso; spatio depresso minus lato antice angustato utrinque subtiliter carinato; elytrorum sutura haud carinata; lamellis abdominalibus haud integris. Long., 1 l.; lat., $\frac{7}{10}$ l.

This is a species of very obscure appearance. In my tabulation of *Scymnus* it falls beside *lubricus*, Blackb., from which it differs *inter alia* by its slightly more evident puncturation, and dark legs.

Queensland; Brisbane.

S. impictus, sp. nov. Ovalis; sat nitidus; pube albida vestitus; totus rufo-brunneus; crebre subtilissime punctulatus; prosterno medio longitudinaliter depresso; spatio depresso sat lato fere parallelo utrinque subtiliter carinato; elytrorum sutura vix subtilissime carinata; lamellis abdominalibus haud integris. Long., 1 l.; lat., $\frac{3}{5}$ l.

The uniform red-brown color of this insect distinguishes it at once from all its allies. In my tabulation it falls beside *australis* from which it differs *inter alia* by its evidently more convex form and the absence of dark markings.

Queensland; taken by Mr. Koebele at Toowoomba.

S. obumbratus, sp. nov. Ovalis; sat nitidus; pube albida vestitus; rufo-brunneus, capite (labro excepto) prothoraceque nigris; sparsim subtilissime punctulatus; prosterno medio longitudinaliter depresso; spatio depresso sat lato fere parallelo utrinque subtiliter carinato; elytrorum sutura haud carinata; lamellis abdominalibus haud integris. Long., 1 l.; lat., $\frac{3}{5}$ l.

Resembles the preceding which it falls beside in my tabulation, differing from it and *australis* in color and in the sparse puncturation of its elytra.

Queensland; taken by Mr. Koebele at Toowoomba.

S. Terræ-reginæ, sp. nov. Breviter late ovalis; sat nitidus; pube albida vestitus; pallide testaceus, elytris hic et illic indistincte obscurioribus; subtilissime sat crebre punctulatus; prosterno medio longitudinaliter depresso; spatio depresso sat lato antice minus angustato utrinque subtiliter carinato; elytrorum sutura haud carinata; lamellis abdominalibus haud integris. Long., $\frac{4}{5}$ l.; lat., $\frac{3}{5}$ l.

This species differs from its allies *inter alia* by its very small size, its short wide form and its uniformly pallid color. The darker blotches on its elytra are scarcely noticeable and look as if they were merely the thickly folded parts of the wings showing through, but on close examination they seem to be real infuscation. In my tabulation of *Scymnus* this insect falls with the preceding two beside *australis*.

N. Queensland; taken by Mr. Koebele near Cairns; also sent by Mr. Cowley.

S. ementitor, sp. nov. (Mas.) Sat late ovalis; sat nitidus; pube albida vestitus; niger, capite prothorace (vitta mediana lata excepta) antennis palpis pedibusque anticis pallide flavis, abdomine (parte mediana basali excepta) tarsisque testaceo-brunneis; capite sat crebre minus subtiliter, prothorace crebre minus subtiliter, elytris crebre dupliciter (sc. subtiliter et subfortiter) punctulatis; prosterno medio longitudinaliter depresso; spatio depresso minus lato antice angustato utrinque subtiliter carinato; elytrorum sutura haud carinata; lamellis abdominalibus haud integris.

Fem. capite et pedibus anticis (tarsis exceptis) obscuris. Long., $1\frac{1}{2}$ l.; lat., $\frac{1}{5}$ l. (vix).

In my tabulation of *Scymnus* this species does not fall very naturally beside any there characterised; it will stand under the heading "HH. Puncturation of elytra much better defined" on p. 249, and is at once distinguishable from all the rest of that group by its prothorax black in the middle with the sides very broadly of a pale yellow color. It bears an extraordinary resemblace to *Platyomus lividigaster*, Muls., from which it differs in generic characters and also in the less coarse puncturation of its elytra, &c.

N. Queensland; taken by Mr. Koebele near Cairns; also sent by Mr. Cowley from the same place.

S. Cowleyi, sp. nov. Sat late ovalis; valde convexus; sat nitidus; pube albida densa erecta vestitus; niger, capite prothorace elytrorum apice antennis palpis pedibus anticis (femoribus supra et subtus lineatim infuscatis) tarsis omnibus abdomineque rufo-testaceis; capite sparsius subtillissime, prothorace crebre subtilissime, elytris crebre sat subtiliter, punctulatis; prosterno medio longitudinaliter depresso; spatio depresso sat lato antice acuminato utrinque subtilissime carinato; elytrorum sutura postice subtilissime carinata; lamellis abdominalibus haud integris. Long., $1\frac{3}{5}$ l.; lat., $1\frac{1}{10}$ l. (vix).

In my tabulation (vide supra) this species stands beside *poonindiensis* and *Meyricki*, differing from both *inter alia* by its strongly convex form (viewed from the side the height of its elytra is not much less than their length), its rufo-testaceous prothorax and the sharply defined limit of the testaceous apical part of its elytra which is like that of *Platyomus Koebelei*. The specimens before me are probably males and it is likely that the head and front legs of the female are darker in color.

N. Queensland; taken by Mr. Cowley near Cairns; also by Mr. Koebele.

S. kamerungensis, sp. nov. (Mas.) Sat late ovalis; sat fortiter convexus; sat nitidus; pube albida densa erecta vestitus; niger, capite prothorace (macula basali angulata excepta) antennis palpis pedibus anticis tarsis omnibus abdomineque (parte antica mediana excepta) stramineis; capite prothoraceque subtiliter sat crebre, elytris dupliciter (sc. subtiliter et—pro hoc genere—sat fortiter) sat crebre punctulatis; prosterno medio longitudinaliter depresso; spatio depresso minus lato antice minus angustato utrinque subtiliter carinato; elytrorum sutura vix manifeste carinasa; lamellis abdominalibus haud integris. Long., $1\frac{1}{5}$ l.; lat., 1 l. (vix).

Fem. capite et pedibus anticis (tarsis exceptis) obscuris.

In my tabulation (vide supra) this species stands beside the preceding *(S. Cowleyi)*, but is easily distinguishable from it and all its allies by the pale straw color of its prothorax with a basal black spot in the form of a triangle with its apex pointing forward (in some examples the base of the triangle a little dilated on each side); this spot seems constant. The species is an exceptionally pretty one.

N. Queensland; taken by Mr. Cowley in the Cairns District, Kamerunga; also by Mr. Koebele.

S. mareebensis, sp. nov. Sat late ovalis; sat nitidus; pube albida densa erecta vestitus; niger, elytris ad apicem anguste rufo-marginatis, capite prothorace (hoc ad basin mediam infuscato) antennis palpis pedibus abdomineque stramineis; capite sparsius prothorace elytrisque confertim, subtiliter punctulatis; prosterno medio longitudinaliter depresso; spatio depresso minus lato antice angustato utrinque subtiliter carinato; elytrorum sutura postice subtilissime carinata; lamellis abdominalibus haud integris. Long., 1 l.; lat., $\frac{7}{10}$ l.

In my tabulation of *Scymnus* this species stands with *flavifrons* and *tenebricosus*,—differing entirely from both in its coloring, from the latter by its larger size, from the former by its finer puncturation, &c. It is probable that I have seen only the male of this species and that in the female the legs or some of them and perhaps the head are darker.

N. Queensland; taken by Mr. Cowley and Mr. Koebele near Mareeba in the Cairns District.

S. Styx, sp. nov. Late ovalis; sat nitidus; pube albida vix fulvescentis, erecta vestitus; niger, antennis palpis tarsisque rufescentibus; capite sat crebre minus subtiliter, prothorace crebre minus subtiliter, elytris minus crebre sat fortiter (pro hoc genere) punctulatis; prosterno medio longitudinaliter depresso; spatio depresso lato antice acuminato utrinque

subtiliter carinato; elytrorum sutura postice subtiliter carinata; lamellis abdominalibus haud integris. Long., $1\frac{1}{5}$ l.; lat., 1 l. (vix).

This species stands near *poonindiensis* and *Meyricki* in my tabulation, differing from both in its entirely black color and also in the stronger and less close puncturation of its elytra. It also resembles *S. brisbanensis*, but is larger, wider, and much more strongly punctured. The unique example before me is probably a female and it is not unlikely that the front tibiæ and perhaps the head of the male are rufescent.

Australia; exact habitat uncertain; taken by Mr. Koebele.

S. subclarus, sp. nov. (Mas.) Sat late ovalis; sat nitidus; pube albida erecta vestitus; niger, capite prothoracis lateribus antennis palpis tibiis tarsisque læte flavis, abdomine brunneo testaceo; capite prothoraceque sparsius subtiliter, elytris sparsius sat fortiter (pro hoc genere) punctulatis; prosterno medio longitudinaliter depresso; spatio depresso modice lato subparallelo utrinque subtiliter carinato; elytrorum sutura haud carinata; lamellis abdominalibus haud integris. Long., 1 l.; lat., $\frac{7}{10}$ l.

This species seems to oscillate between the groups of *poonindiensis* and *flavifrons* in my tabulation, as it is exactly of the size which I selected as the limit of those groups. It can however be at once separated from all the described species in both groups by the markings of its prothorax which consist of a bright yellow and very sharply defined marginal spot on each side. It comes near the preceding species *(S. Styx)* in the puncturation of its elytra but differs widely in color in less convex form and in its prothoracic puncturation. The unique type is a male; probably the female has darker front tibiæ and head.

Victoria; Alpine region.

S. subevanidus, sp. nov. Sat late ovalis; modice convexus; sat nitidus; setis erectis elongatis pallidis sparsim vestitus; niger, antennis palpis pedibusque testaceis; capite prothoraceque sat lævibus, elytris grosse sparsim punctulatis; elytrorum sutura haud carinata; lamellis abdominalibus haud integris. Long., $\frac{1}{2}$ l. (vix); lat., $\frac{3}{10}$ l.

The unique example of this extremely minute insect has its head and prothorax bent down in a manner that precludes a sufficient examination of its prosternum but as far as I can see the median part of the prosternum is longitudinally depressed as in the preceding species. Owing to the (in this genus) very exceptional sculpture of the elytra I deem it probable that a satisfactory dissection of specimens would lead to the removal of this

species from *Scymnus* but in the absence of such an investigation I find nothing to hinder its being placed there; it has the elytral epipleuræ without distinct foveæ, incomplete abdominal lamellæ, and comparatively small metasternal lamellæ of a *Scymnus*. Its eyes however are small for a *Scymnus* and a little strongly granulated,—but without being able to specify any other clearly distinctive character I do not think it seems desirable to found a new genus on these slight peculiarities alone. The insect bears a general resemblance to *S. vagans*, Blackb., but is at once distinguishable by its incomplete abdominal lamellæ, small eyes, and very coarse (fovea-like) sparse elytral puncturation. The long sparse elytral pubescence of this insect places it in my tabulation beside *S. notescens*, to which it bears little general resemblance.

N. Queensland; taken by Mr. Koebele near Cairns.

S. planulatus, sp. nov. Ovalis; minus convexus; sat nitidus; pube albida suberecta vestitus; piceo-niger, elytris ante apicem antennis tarsis et abdominis apice rufescentibus; capite sparsius distincte, prothorace crebre minus distincte punctulatis; prosterno æqualiter convexo; elytrorum sutura (parte basali excepta) subtiliter sat distincte carinata; lamellis abdominalibus haud integris. Long., 1 l.; lat., $\frac{7}{10}$ l. (vix).

The only previously described Australian *Scymnus* having the abdominal lamellæ incomplete and the prosternum not longitudinally carinate in the middle is *S. inusitatus*, Blackb., which apart from color differs from the present species *inter alia* by its much more convex form and stronger puncturation. The elytra of this insect bear an ill defined reddish blotch behind the middle but which does not attain either the lateral margin or the apex.

N.S. Wales; taken by Mr. Koebele at Paramatta, on *Eucalyptus*.

S. mitior, sp. nov. Sat late ovalis; sat convexus; sat nitidus; pube albida erecta vestitus; rufus, nigro-variegatus (colore nigro prothoracis vittam latam medianam antice abbreviatam, et elytrorum vittam suturalem postice abbreviatam circa scutellum dilatatam et pone medium ut fascia margines attingens dilatatam, formanti), sternis mediis et abdominis basi plus minusve infuscatis; capite prothoraceque subtiliter sat crebre, elytris crebre sed paullo minus subtiliter, punctulatis; prosterno æqualiter convexo; elytrorum sutura vix manifeste prope apicem carinata; lamellis abdominalibus integris. Long., 1 l.; lat., $\frac{7}{10}$ l.

In my tabulation of *Scymnus* this species stands beside *parallelus*, Blackb., from which it differs by its oval form, totally distinct markings, &c. The first ventral suture (though much

less strongly marked than the second) is less enfeebled in the middle than in most Australian *Scymni*.

N. Queensland; taken by Mr. Koebele near Cairns.

S. ambulans, sp. nov. Sat late ovalis; modice convexus; sat nitidus; pube albida erecta vestitus; brunneo-testaceus, elytris totis piceo-nigris, prothorace sternorum parte mediana femoribusque plus minusve infuscatis; capite sparsius distincte, prothorace elytrisque vix distincte, punctulatis; prosterno medio longitudinaliter depresso, spatio depresso minus lato antice angustato utrinque subtiliter carinato; elytrorum sutura vix manifeste prope apicem carinata; lamellis abdominalibus integris. Long., $1\frac{1}{3}$ l.; lat., 1 l. (vix).

In my tabulation of *Scymnus* this species stands beside *vagans*, Blackb., with which its very much larger size renders it quite incapable of confusion. The first ventral suture is less enfeebled in the middle than in most Australian *Scymni*.

N.S. Wales (Blue Mountains) and Queensland (Moreton Bay); taken by Mr. Koebele.

S. varipes, Blackb. Sat late ovalis; modice convexus; sat nitidus; pube fulvescenti erecta vestitus; niger, capite prothoracis angulis anticis summis antennis palpis tibiis, anticis tarsis omnibus abdomineque testaceis, tibiis iuntermediis rufescentibus; capite crebrius subtilius, prothorace elytrisque vix distincte, punctulatis; prosterno medio longitudinaliter depresso, spatio depresso minus lato antice sat angustato utrinque subtiliter carinato; elytrorum sutura postice subtiliter carinata; lamellis abdominalibus integris. Long., $1\frac{3}{5}$ l.; lat., $1\frac{1}{5}$ l.

Stands in my tabulation with the preceding and *S. vagans*,—differing from both *inter alia* by its larger size, and its undersurface black except the testaceous abdomen. The first ventral suture is less enfeebled in the middle than in most Australian *Scymni*.

This is the insect formerly mentioned by me as *Scymnodes varipes* (? var. of *S. Koebelei*). It has not however the antennæ or the metasternal lamellæ (both, in my opinion, essential characters) of *Platyomus (Scymnodes)* but of *Scymnus* and therefore notwithstanding its general facies of *Platyomus* I have no hesitation in placing it in *Scymnus*. I regret that when I formerly mentioned this insect I had not observed the form of the metasternal lamellæ in *Platyomus* (a character that seems to have escaped the notice of other authors also) and so erroneously referred this insect to that genus.

Queensland; taken by Mr. Koebele near Toowoomba on *Eugenia*.

S. yarrensis, sp. nov. Elongato-ovalis; minus convexus; sat nitidus; pube albida vestitus; nigro-piceus, capite prothoracis lateribus in utroque elytro vitta dorsali (vittis duabus his postice inter se conjunctis) antennis palpis pedibus abdomineque postice testaceis; capite sparsius distincte, prothorace crebre subtilius, elytris crebre fere subfortiter, punctulatis; prothoracis lateribus sat fortiter rotundatis; prosterno medio longitudinaliter depresso, spatio depresso minus lato antice minus angustato utrinque subtiliter carinato; elytrorum sutura postice subtilissime carinata; lamellis abdominalibus integris. Long., $\frac{4}{5}$ l.; lat., $\frac{1}{2}$ l. (vix).

This species stands in my tabulation beside *S. parallelus*, Blackb., which it closely resembles, differing from it chiefly in the much stronger puncturation (and much more strongly rounded sides) of its prothorax. Both these species bear much resemblance to the insect which I have called *Midus* (?) *pygmæus* but are at once separated from it *inter alia* by their first ventral suture being almost entirely effaced in the middle.

Victoria; Upper Yarra; presented to me by Mr. French.

NOVIUS.

N. simplicipennis, sp. nov. Sat late ovalis; minus convexus; sat nitidus; pubescens; niger, elytris labro antennis tarsis et abdomine (parte basali infuscata excepta) sanguineis; supra confertim subtiliter punctulatus. Long., $1\frac{2}{5}$ l.; lat., $1\frac{1}{10}$ l.

At once distinguishable from all its previously described Australian congeners *inter alia* by its coloring. *N. ruber*, Blackb., the only one of them having unicolorous red elytra, has head, prothorax, and legs also red, and is differently punctured.

Queensland; taken at Toowoomba by Mr. Koebele.

N. discoidalis, sp. nov. Breviter late ovalis; sat convexus; nitidus; pubescens; niger, elytrorum macula magna basin attingenti labro antennis tarsis abdomineque (hoc ad basin infuscato) brunneo-rufis; supra subtilissime sat crebre punctulatus.

Var. elytrorum macula ad apicem continua. Long., $1\frac{3}{5}$ l.; lat., $1\frac{3}{10}$ l.

More like the preceding than any other previously described Australian *Novius*, but I do not think it possibly an extreme var. of that species since, apart from its having very distinct elytral markings, it is a larger, broader, and more convex insect with elytral puncturation certainly both finer and less close. Even should it prove to be merely a form of a very variable species it seems to be a form to which it would be convenient

that a distinctive name should appertain. In one example before me the elytral spot extends along the base from close to the suture, includes the extreme front of the lateral margin, and narrows hindward till it ceases in a sharp point considerably behind the middle and a little nearer to the suture than to the lateral margin; the spot in the other example varies inasmuch as before it reaches a point it begins to dilate again and then spreads out over the whole of the apex. The convexity of this species is very similar to that of *N. cardinalis*, Muls.

Queensland; taken by Mr. Koebele near Toowoomba.

N. tripustulatus, sp. nov. Breviter late ovalis; fortiter convexus; nitidus; pubescens; niger, elytrorum macula magna humerali et macula communi apicali labro antennis tarsis abdomineque (hoc ad basin infuscato) rufis; supra confertim subtiliter punctulatus. Long., $1\frac{2}{5}$ l.; lat., $1\frac{3}{10}$ l. (vix).

Differs from the preceding species, apart from markings, by its still shorter and more convex build and by its closer less fine puncturation, which resembles that of *N. simplicipennis;* its puncturation is evidently less close and somewhat finer than that of *N. cardinalis*, Muls.

N. Queensland; taken by Mr. Koebele near Cairns.

N. limbatus, sp. nov. Breviter late ovalis (subcircularis); valde convexus; pubescens; sanguineus, capite (labro excepto) prothorace (lateribus exceptis) et elytris (margine lato laterali et apicali excepto) piceis; supra confertim subtiliter punctulato. Long., $1\frac{1}{5}$ l.; lat., $1\frac{1}{10}$ l.

Very distinct from the previously described Australian *Novii* by its color and markings. It is a very short, wide, and extremely convex species (viewed from the side its height is not much less than the length of its elytra). The puncturation of its elytra is (for a *Novius*) decidedly strong, being stronger than in any of the preceding three species and slightly stronger than in *N. cardinalis*, Muls., but it is not quite so close as in the last named species.

N. Queensland; taken by Mr. Koebele near Cairns.

CYCLOSCYMNUS.

C. concolor, sp. nov. Late ovalis, vix circularis; nitidus; valde convexus; setis brevissimis sparsis vix perspicue vestitus; totus niger; capite vix manifeste, prothorace sparsim obsolete, elytris sparsim subfortiter, punctulatis; prosterno medio vix longitudinaliter depresso; lamellis abdominalibus haud integris; segmento ventrali apicali crebre fortiter punctulato. Long., $\frac{3}{5}$ l.; lat., $\frac{1}{2}$ l.

Quite distinct from *C. minutus*, Blackb., by its entirely black color; also differs in its less circular form and somewhat greater convexity. I have before me two examples which differ from

the type in being evidently larger (long., $\frac{4}{5}$ l.) and in their apical ventral segment being less strongly punctured. I judge these differences to be sexual, and the larger examples to be females.

N. Queensland; taken by Mr. Koebele near Cairns.

C. minutus, Blackb. In describing this insect I called it "minus fortiter punctulatus." I think this phrase liable to convey the impression of its puncturation being feebler than it actually is and that "subfortiter" would be more accurate than "minus fortiter," the puncturation of the elytra being rather strong and well-marked for a *Scymnid*.

SERANGIUM.

S. bicolor, sp. nov. Late ovalis, subcircularis; nitidus; valde convexus; setis albidis sat elongatis sparsis vestitus; niger vel piceo-niger, capite antice antennis palpis pedibus abdomineque apicem versus fulvis, nonnullorum exemplorum (? immaturorum) corpore subtus toto fulvo; fere lævis. Long., $\frac{4}{5}$ l.; lat., $\frac{7}{10}$ l. (vix).

The uniform (except on the front of the head) black color of the upper surface at once distinguishes this species from all the previously described members of the genus.

N. S. Wales; taken by Mr. Froggatt near Maitland; specimens taken by Mr. Koebele in N. Queensland do not seem to differ from those sent by Mr. Froggatt.

BUCOLUS.

B. frater, sp. nov. Sat late ovalis; sat fortiter convexus; sat nitidus; pube albida brevi erecta vestitus; piceo-niger antennis tarsis abdomineque rufis; capite prothoraceque crebre, elytris minus crebre, subfortiter punctulatis. Long., $1\frac{3}{5}$ l.; lat., $1\frac{1}{5}$ l.

This species is closely allied to that which I described as *B. convexus*, differing from it chiefly by its prothorax concolorous with the general surface and the very evidently less close puncturation of its elytra. I doubt whether these two species will remain permanently in *Bucolus*; indeed I should like to propose a new generic name for them, but cannot find any distinctive structural character that seems to me of sufficient importance for the purpose. They have the produced prosternum, the externally angular tibiæ, the strongly foveolate epipleuræ and the peculiar abdominal *lamellæ* of *B. Fourneti*, Muls. The last-named however differ slightly; those of *B. Fourneti* do not reach the apex of the first ventral segment and therefore are not confused with the first ventral suture; when this is the case, in most *Coccinellidæ* the lamellæ are complete but in *Bucolus* the whole lamella becomes confused externally with the general surface and its

external margin is scarcely traceable. In the present species the external margin, however, is distinctly returned *towards* the front margin of the basal segment but terminates abruptly before reaching it. The chief differences however between these species and *B. Fourneti* consist in their much greater convexity (the latter being an exceptionally depressed *Coccinellid)* and their much narrower and more horizontal elytral epipleuræ. These differences give them an extremely different facies but nevertheless seem scarcely satisfactory characters for founding a new genus. Their general appearance is that of *Cryptolæmus Montrouzieri* but that insect has non-foveolate epipleuræ, very different abdominal lamellæ, &c.

Queensland; taken by Mr. Koebele at Nerang.

B. posticalis, sp. nov. Sat late ovalis; sat fortiter convexus; sat nitidus; pube albida brevi erecta vestitus; piceo-niger, capite prothoracis lateribus elytrorum parte apicali tertia antennis palpis pedibus abdomineque rufis, nonnullorum exemplorum (?immaturorum) corpore subtus toto rufo; capite sparsius subtilius, prothorace crebre subtilius, elytris crebre subfortiter, punctulatis. Long., $1\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l. (vix).

This species is congeneric with and closely allied to the preceding *(B. frater)* and *B. convexus*, Blackb., but like them it seems dubiously placed when associated with *B. Fourneti*, Muls. The bright red color of the apical third part (or even a trifle more) of its elytra distinguishes it at once from its described allies. Its puncturation is much like that of *B. convexus* from which it differs by its considerably more convex form as well as in color (sc. red head and legs, prothorax black except at the sides, elytra partly red).

N. Queensland; taken by Mr. Koebele near Cairns.

RHIZOBIUS.

R. Crotchi, sp. nov. Ovalis; minus convexus; sat nitidus; pube fulva suberecta vestitus; rufus, elytris totis fusco-nigris; capite prothoraceque subtilius vix crebre, elytris subfortiter sat crebre, punctulatis; prosterno medio longitudinaliter depresso; spatio depresso minus lato, antice angustato, utrinque subtiliter carinato.

Maris segmento ventrali 5° bifoveolato, fovearum interspatio alterutræ foveæ latitudine æquali. Long., $2\frac{1}{2}$ l.; lat., $1\frac{3}{5}$ l.

In my tabulation of *Rhizobius* (Tr. R.S., S.A., 1892, pp. 257, &c.) this species stands next to *R. Bakewelli*, Crotch., thus—"EEE. Elytra unicolorous . . . *R. Crotchi*, Blackb." It is much like *R. Bakewelli* but besides the absence of elytral marking it is smaller and has the foveæ on the fifth ventral segment

of the male much more widely apart. Compared with *R. major*, Blackb., it is much more finely punctulate.

Queensland; taken near Port Mackay.

R. gosfordensis, sp. nov. Elongato-ovalis; sat convexus, elytris pone scutellum fere subgibbosis, sat nitidus; pallide fulvo-pubescens et setis erectis sparsim vestitus; rufescens, prothorace (margine antico et laterali anguste dilutiori excepta) fere nigro, elytris femoribusque picescentibus; capite prothoraceque minus fortiter subcrebre, elytris vix fortiter sat crebre, punctulatis; his in spatio communi paullo pone scutellum posito sublævibus; prosterno medio longitudinaliter depresso; spatio depresso minus lato, antice sat angustato, utrinque subtiliter carinato. Long., $1\frac{7}{10}$ l.; lat., $1\frac{1}{10}$ l. (vix).

This species is very near *R. speculifer*, Blackb., beside which it must stand in my tabulation of the genus. It is a notably narrower and more elongate insect with its elytral puncturation distinctly less strong.

N. S. Wales; taken by Mr. Koebele near Gosford.

R. discipennis, sp. nov. Breviter late ovalis; valde convexus, elytris pone scutellum fere subgibbosis; sat nitidus; pube albida suberecta et setis longioribus magis erectis vestitus; niger vix subæneus (nonnullis exemplis rufescentibus) antennis palpis tibiis tarsis abdomineque dilutioribus (nonnullorum exemplorum pedibus totis, vel etiam corpore subtus toto, pallidis); capite crebre distincte, prothorace crebre sat aspere, elytris sparsius subfortiter, punctulatis; his in spatio communi paullo pone scutellum lævibus, hoc spatio utrinque puncturis fortiter impressis lineatim positis marginato; prosterno medio longitudinaliter depresso; spatio depresso antice acuminato, utrinque subtiliter carinato. Long., $1\frac{1}{10}$ l.; lat., $\frac{4}{5}$ l.

In my tabulation this species must stand with the preceding species (*R. gosfordensis*) and *R. speculifer* from which it is at once distinguishable by the common unpunctured space on its elytra being bordered on either side by a well-defined line consisting of some of the largest punctures on the elytra.

N. Queensland; taken by Mr. Koebele near Cairns.

R. eminens, sp. nov. Sat late ovalis; fortiter convexus; sat nitidus; setis subtilibus sat elongatis erectis vestitus; rufus, elytris læte cœruleis, sterno medio subinfuscato; capite subcrebre sat fortiter, prothorace vix crebre sat fortiter, elytris sparsim fortiter, punctulatis; his in spatio communi paullo pone scutellum lævibus, hoc spatio utrinque puncturis lineatim positis marginato; prosterno medio longitudinaliter

depresso; spatio depresso antice acuminato, utrinque subtiliter carinato. Long., 1 l.; lat., $\frac{7}{10}$ l.

In my tabulation this species stands beside *R. cæruleus*, Blackb., from which *inter alia* its very different puncturation readily separates it. Apart from color it is near *R. discipennis* differing *inter alia* by the stronger and much less close puncturation of its elytra.

N. Queensland; taken by Mr. Koebele near Cairns.

R. subaustralis, sp. nov. Oblongo-ovalis; minus convexus; sat nitidus; pube brevi albida sat erecta vestitus; rufus, elytris (margine laterali sat anguste rufo excepto) piceo-nigris; capite prothoraceque leviter (nec subtiliter) sat crebre, elytris sat fortiter sat crebre æqualiter nec rugulose, punctulatis; prosterno æqualiter convexo. Long., 2 l.; lat., $1\frac{3}{10}$ l.

This species is closely allied to *R. australis*, Blackb., but is considerably smaller and *inter alia* its elytra are evenly and not at all rugulosely punctulate (in *R. australis* large and small punctures are crowded together in a manner that gives an appearance of rugulosity).

N. Queensland; taken by Mr. Koebele near Cairns.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

1894-95.

Ordinary Meeting, November 6, 1894.

Prof. R. Tate (President) in the chair.

Exhibits.—Dr. Stirling exhibited photographs of "Meridional Ant-hills" taken by Mr. Foelsche at Knuckey's Lagoon, N.T., some miles south of Palmerston, N.T., together with some specimens of the ants. The ant-hills are so called from the constant disposition of their long axes in a northerly and southerly direction. These structures at this locality are from seven to eight feet high and about six feet broad, with a concave surface to the west, and a convexity to the east. Mr. Saville Kent, Inspector of Fisheries, W.A., has noticed similar ant-hills near Roebuck Bay, W.A.; and they were also observed by the Horn Expedition at Burt Plains in front of the Macdonnell Range. J. G. O. Tepper, F.L.S., referred to the occurrence of *epidote* and garnet rock in the Barossa Ranges, S.A., near Tanunda, and submitted an analysis of the same made by G. Goyder, jun, the Government Analyst. (See Annual Report Sch. Mines, Adelaide, for 1894, p. 147.) Also a sample of a kind of earth eaten by the aborigines of Roebuck Bay, W.A., and obtained from the ant-hills in the neighbourhood. (For analysis by G. Goyder, jun., the Government Analyst, see op. cit., p. 146.)

Paper.—"Remarks on the Native Tongues in the District of Port Darwin, N.T.," by T. A. Parkhouse, formerly accountant and pay-master, S.A. Gov. Railways, Port Darwin.

Ordinary Meeting, December 4, 1894.

Prof. R. Tate (President) in the chair.

Exhibits.—Prof. Tate exhibited a specimen of the Australian Roller *(Eurystomus australis)* from Walgett; also photographs

of the Horn Exploring Expedition. J. G. O. Tepper, F.L.S. showed a collection of mantids from the Museum, containing specimens from the Horn Exploring Expedition. Three species from the latter were probably new to science, and belonged to the genus *Haania*. W. Howchin, F.G.S., laid on the table a piece of lignite with bone-breccia from Montefiore, S.A., at a depth of 45 feet. Also an obsidian bomb shaped into a cutting instrument by the aborigines.

Papers.—"Results of Experiments on the Solubility of Gold by Potassium Cyanide and certain Double Cyanides," by George Goyder, jun., Government Analyst. "Additions to the Flora of South Australia," by Prof R. Tate.

Ordinary Meeting, April 2, 1895.

Prof. R. Tate (President) in the chair.

Exhibits.—Prof. Tate, on behalf of the Conservator of Water, exhibited fossil fruits from a depth of 350 feet at the lake crossing, Lake Callabonna. The fruits belonged to the extinct genus *Celyphina*, N.O. *Proteaceæ*. The species was distinct from *C. McCoyi*, the only known species. The stratigraphical data might locate it as either Cretaceous or Pliocene. Also older tertiary fossils from Victoria, some still retaining their color markings, and in the case of *Trigonia Howitti* the ligament was well preserved. J. G. O. Tepper, F.L.S., showed the Orthoptera of the Horn Exploring Expedition. Lawrence Birks, B.Sc., laid on the table some Silurian fossils gathered from the Browning series, N.S.W., by J. Mitchell, amongst which were two specimens of *Encrinus Mitchelli*.

Papers.—"Description of the New Element, *Argon*," by Prof. Rennie, D.Sc. "New Facts relating to the Glacial Features at Hallett's Cove," by W. Howchin, F.G.S. "Additions to Australian Coleoptera," by Rev. Thos. Blackburn, B.A.

Ordinary Meeting, May 7, 1895.

Prof. R. Tate (President) in the chair.

Exhibits.—W. Howchin, F.G.S., exhibited a collection of *zeolites* and other inclusions from the basalts of Victoria, there being varieties of *chabazite*, *phacolite*, *phillipsite*, *mesolite*, *calcite*, *ferrocalcite*, and a very handsome specimen of *aragonite*. The minerals had been collected by the Rev. Glanville Ramage. J. G. O. Tepper, F.L.S., exhibited a large specimen of *Polyzosteria obscuroviridis* with egg-case from Beltana; also *Danais ardrippens* from Gawler and the New Hebrides (Rev. W. Gray); also *Van-*

essa urticæ from the New Hebrides. A. Zietz, F.L.S., showed a specimen of *Telephusa transversa* from Ockenden Creek. It is found also in the Finke and Cooper Creeks.

Ballot.—John H. Cooke was elected a Fellow, and John B. Cleland an Associate.

Papers.—"Petrological Notes," by J. Moulden. "S.A. *Muricidæ* and *Fusidæ*," by J. C. Verco, M.D.

Ordinary Meeting, June 4, 1895.

Prof. R. Tate (President) in the chair.

The President reported that a suggestion from the Mayor of Adelaide to hold a conjoint Conversazione of the Scientific and Art Societies towards the end of the present year, had been considered at a special Council meeting. It was recommended to the favourable notice to the Society. The President and the Hon Secretaries were appointed to represent the Society at any meetings that might be held to carry the project into effect.

Exhibits.—W. Howchin, F.G.S., exhibited a very fine specimen of nested quartz crystals from the quartzite quarries at Mitcham; also a pophyritic erratic from Hallett's Cove, the point of interest of which was the formation of pseudomorphic quartz in cavities caused by the dissolving of orthoclase feldspar.

Papers.—Mr. C. Hedley communicated a "Note on *Arca domingensis*," in which he adds to the list of synonyms furnished by Mr. Brazier, Proc. Lin. Soc., N.S. Wales, p. 145, 1894, the following names:—*A. donaciformis*, Rv.; *A. pholadiformis*, C. B. Adams; and *A. laminata*, Angas. Prof. Tate stated that *A. MacCoyi*, Tenison Woods, is the same as *A. laminata*, Angas; and that Mr. Cooke, Ann. Mag. Nat. Hist., Vol. xviii., p. 94, 1886, considers that there are three species of the type of *Arca plicata*, Chem.—*gradata*, Brod. and Sow., is the W.-American form; *Domingensis* and *squamosa*, Lamarck, is the W.-Indian form; and *divaricata*, Sowb. (=*plicata*, Chem.), is the E.-Indian form [and the one represented in Australasian seas]. "Supplementary Notes on Tertiary Geology in Victoria," by Prof. R. Tate and John Dennant, F.G.S. "Characteristics and Origin of the Larapintine Flora," by Prof. R. Tate.

Ordinary Meeting, July 2, 1895.

Prof. R. Tate (President) in the chair.

Exhibits.—Prof. Rennie, D.Sc., exhibited for Mr. Turner a portion of a nodule of barytes occurring in the clay slates at Brighton.

Papers.—"Anthropological Notes," by K. Dahl. "The Carabidæ of Lake Callabonna," by T. G. Sloane. "Cannibalism as it is practised on Tanna, New Hebrides," by Rev. W. Watt, communicated by Rev. W. Gray.

Ordinary Meeting, August 6, 1895.

Prof. R. Tate (President) in the chair.

Exhibits.—J. G. O. Tepper, F.L.S., laid on the table a case of Orthoptera illustrating the family of *Truxalidæ*, or helmet locusts; also an Australian species of *Coryphistes*, which inhabits scrub and forest lands, feeding on the leaves of the eucalypts. The *Truxalidæ* are carnivorous and feed on isects.

Ballot.—Edwin Ashby was elected a Fellow.

Papers.—"Notes on Blattariæ," by J. G. O. Tepper, F.L.S. "Carboniferous Foraminifera from Western Australia," by W. Howchin, F.G.S. "Two new species of Cretaceous Foraminifera," by W. Howchin, F.G.S. "Fossil Plant Remains from Leigh's Creek." by Robert Etheridge, F.G.S.

Ordinary Meeting, September 3, 1895.

Prof. R. Tate (President) in the chair.

Exhibits.—Prof. Tate exhibited specimens of *Trigonia Tatei* (Pritchard) from the Eocene of the Moorabool Valley; and an example of an undescribed species from the Miocene of the River Murray Plain, which he named *T. Murravica*. It is allied to *T. Howitti*, McCoy, but the radial costæ are much broader than the interspaces and coarsely subnodulose. Also two species of ammonites, showing some affinity to the Cretaceous species, *A. varicosus*, of Europe. They were given to Dr. Stirling when at Palmerston in 1891, as coming from near that place. Prof. Tate exhibited specimens of *Cryptodon flexuosus*, Montague, dredged at Port Esperance, Tasmania, by Mr. Harrison. Subsequently, November 28, 1894, Mr. Brazier communicated the same information to the Linnean Society, Sydney (see Proc., Vol. ix., p. 725, 1895), and further intimated that he had collected the species off Port Stephens, N.S.W., as early as 1874. The discovery of this European species in Tasmanian waters belongs, however, to Mr. Petterd, who submitted to the speaker about twelve years ago specimens taken off Brown River, on which I reported—"*Cryptodon* sp., but slightly different from *C. flexuosus* of European seas." "The discovery of a closely allied species in the Eocene beds at Muddy Creek may opportunely be recorded now. The fossil species, which I name Cryptodon su b

FLEXUOSUS, differs in the following particulars—the antero-dorsal line is deeply concave, the anterior side is more produced, and the antero-ventral margin is truncatedly rounded; the shell is less convex, the posterior angulation is only moderately elevated, and in consequence the posterior area is flatly convex and its margin hardly at all insinuate. Diameters—Umbro-ventral, 4; ant-posterior, 3.75 mm. (A right valve.)"—R.T.

PAPER.—"The Cerebrum of *Notoryctes typhlops*," by G. E. SMITH, M.D., communicated by Dr. STIRLING.

ANNUAL MEETING, OCTOBER 1, 1895.

Prof. R. TATE (President) in the chair.

CONGRATULATION.—The President read a telegram from Baron F. von Mueller conveying his best greetings to the Society at its anniversary meeting closing a brilliant year's research.

BALLOT.—Rev. GRANVILLE RAMAGE was elected a Fellow.

PAPERS—"Descriptions of New Coleoptera," by Rev. THOMAS BLACKBURN, B.A. "Descriptions of New Species of Mollusca," by J. C. VERCO, M.D.

ANNUAL REPORT.—The Annual Report and balance-sheet were read and adopted.

ELECTION OF COUNCIL.—President, Walter Howchin, F.G.S.; Vice-Presidents, Prof. R. Tate and Rev. Thomas Blackburn, B.A.; Hon. Treasurer, Walter Rutt, C.E.; Hon. Secretaries, W. L. Cleland, M.B, and W. B. Poole; Members of Council, Prof. Rennie, D.Sc., E. C. Stirling, C.M.G., M.D., F.R.S., S. Dixon, M. Holtze, F.L.S., J. S. Lloyd, and Mr. W. H. Selway.

ELECTION OF AUDITOR.—D. J. Adcock was elected Auditor for the ensuing year.

PRESIDENTIAL ADDRESS.—The retiring PRESIDENT (Prof. R. Tate) gave his Presidential address.

ANNUAL REPORT.

The Council has to report that the scientific work of the Society has been carried on successfully during the past year, and that in the Proceedings of the Society for 1894-95 will appear various important papers bearing on different branches of natural science. Amongst these may be mentioned further contributions to the botany of South Australia, both recent and fossil; descriptions of new shells and a more elaborate study of species previously known; continued contributions to entomology; geological papers relating to the marine tertiaries of Australia and the glacial features at Hallett's Cove; descriptions of new foraminifera; and a study of the brain of notoryctes. An important vocabulary of the natives of Port Darwin has also been added to those already known, and a description of one of the jealously-guarded rites of the aborigines of Australia.

The Council has also much pleasure in reporting that Sir Thomas Elder has furnished the necessary funds for completing the third and final part of the volume which has been dedicated to recording the scientific results of the Elder Exploring Expedition. This part will contain the botanical and anthropological results of the Expedition, and will be profusely illustrated, making with the previous two parts a valuable contribution to the scientific exploration of Australia.

During the past year three new Fellows and one Associate have been elected; one Corresponding Member and one Fellow have died; and four Fellows have resigned.

The obituary includes the name of T. H. McGillivray, M.R.C.S., Eng., F.L.S., of Sandhurst, Victoria, a Corresponding Member of this Society. He was elected in 1889, and was well known for his contributions to Australian Polyzoa, recent and tertiary. A list of the Polyzoa from the Cape Otway beds was communicated by him to this Society only a few weeks ago, and in Vol. XII. of the Society's Proceedings is published a list of South Australian Polyzoa furnished by him. His *opus magnum*, the Tertiary Polyzoa of Victoria, is in course of publication under the auspices of the Royal Society of Victoria.

It is with regret also that the Council has to refer to the death of one of its oldest Fellows in the person of George Mayo, F.R.C.S., Eng., who was elected in 1853, the year in which the Society was started under the name of the Philosophical Society

of South Australia. It may be interesting to note that Dr. Garran, of Sydney, an Hon. Fellow, and Mr. Robert Kay, of the Public Library, Adelaide, a Fellow, are the only survivors of that year's election.

The membership of the Society consists at the present date of 11 Hon. Fellows, 73 Fellows, 15 Corresponding Members, and two Associates.

Two new exchanges with learned Societies and publishers have been made, namely, the University of California and the Museum of Natural History, Paris.

The library of the Society continues to be enriched by the receipt of scientific periodicals from all parts of the world, and the Council has had some forty volumes of these bound during the past year, to facilitate their being utilised by the Fellows and Members. On the shelves of this Society are to be found scientific serials not easily met with elsewhere. It would afford the Council much satisfaction if this branch of the Society's usefulness was utilised to a greater extent. The running index kept by the Hon. Sec., allows of easy reference to any recent additions.

The Anniversary Address of the President Professor Ralph Tate.

Without preamble, I will beg your indulgence whilst I endeavor to briefly treat of

Some Work of the Society since 1876.

The past history of this Society may be divided conveniently into two periods—(1) that from its inception in 1853 to 1876, and (2) that from 1876 to the present. During the latter period monthly meetings have been held without intermission, save for each summer recess, and publication of its Proceedings have been regular. It was during my presidency that a better organization was adopted, which has eventuated in the creditable position that the Society now holds among similar institutions in the Australasian Colonies. Now, at the close of a second term of office I may be pardoned if I speak with pride of the results achieved during the past eighteen years.

It was at about the commencement of the second stage in the life of the Society that it was remarked, "Why contribute to such an obscure publication?" But, despite the implied reproach, the small band of workers at that time was not to be deterred from striving to make this Society an exponent of science in South Australia, believing that with judicious nursing this scientific weakling might receive increasing support by the advent of other laborers, and eventually attain to some measure of independence. This expectation has for some few years been realised, as may be gauged by the demand for our publications and the many applications made by others than Fellows to use our Transactions as a channel of communication to scientific readers. For this achievement we owe a debt of gratitude to the loyalty of several contributors whose papers might have adorned the publications of Societies of the highest standing, and who thereby ran the risk of self-condemnation to comparative obscurity. "All's well that ends well;" for we have passed the critical stage of our existence, whilst the work of the future can only be curtailed by want of pecuniary means. Indeed, already have some papers been diverted into other channels for publication through this cause.

The subjects which have engaged our attention are diversified, whilst the many papers on Zoology, Anthropology, Geology, and Botany contained in our volumes of Transactions are results which close a past of unwarranted belief in the incapabilities of

the Society to advance technical knowledge and open a future of extended researches boundless in fertility of problems and of unknown possible effects in the material advancement of this continent. These results are the outcome of individual effort, and it is not possible to estimate the value that might have been attained if the separate workers had been controlled by an organization; and I am strongly impressed that a federation of the scientific bodies in Australia could bring about at the least a scheme for the organization of scientific publication with advantage to all concerned. The Association for the Advancement of Science exercises such organising power, not deliberately but unconsciously; and in doing so seeks to protect the individual or a people from the intellectual blood-sucking propensities of a neighbor. The fact that South Australia accepts such a degrading position in relation to its Agriculture and Botany with Victoria, or to its Geology with New South Wales, is in evidence of the desirability of an interprovincial organization which would exercise a wholesome influence on the progress of science. The fact that Victoria and New South Wales have peculiar gifts and talents makes co-operation all the more indispensable to the less fortunately situated of their sisters; each should no longer continue to profit by the experience of the other without undertaking some share of the task.

So far back as 1879 I ventured to express the opinion that the science of this Society was largely, perhaps too largely, that which is comprised under the term Natural History, and with a tendency to the technique of the subject rather than the philosophical study of it. This implies that the early history of this Society represents a time when scientific workers were few, and of the "good-all-round" type of scientist, and therefore popular expositors; that gradually specialization in scientific pursuits has been growing, either by the older workers narrowing their sphere of observation, or by the advent of new compatriots already specialists. But the facts of identification and distribution are fundamental, and to the accumulation of which the Society has almost exclusively given its attention during the last fifteen years or more. In evidence, I offer a summary of the work done by the Society in the domain of diagnostic Natural History; this does not take into account a very considerable number of species which have been either redescribed or better defined; but at the same time I express no opinion of the validity of the genera and species diagnosed, except for those which I am personally responsible. Our competitor for first place in this direction among the Australasian Scientific Societies is the Linnean Society of New South Wales; but this Society comes in a good second in the race for distinction.

Summary of Diagnostic Natural History

(Published in the Transactions of the Royal Society, South Australia, inclusive of vol. XIX., 1895).

	New Genera.	New Species.
Zoology—		
Mammalia	1	1
Reptilia	—	7
Crustacea	1	6
Insecta—		
Coleoptera	85	1,080
Lepidoptera	24	338
Hymenoptera	—	3
Orthoptera	18	122
Coccidæ	—	16
Gastropoda and Lamellibranchiata ...	2	131
Polyzoa	—	12
Total	131	1,716
Botany—		
Phanerogamia	3	51
Vascular Cryptogamia	—	1
Total	3	52
Palæontology—		
Older Tertiary	9	591
Cretaceous	—	2
Jurassic	—	1
Cambrian	—	13
Total	9	607
Mineralogy	—	1
Totals	143	2,376

Fellows might like to be reminded of the more important achievements in other departments of Natural Science, for it is out of the question to attempt to deal comprehensively with all the subjects which have been published by the Society. In Geology, we claim to have elaborated a Cambrian fauna, and as a consequence to have determined an Archæan or preCambrian group of rocks, thus adding those two names to the table of the stratified rocks of Australia; to have determined the occurrence of strata over a large area in Central Australia yielding Silurian fossils, which are of a type hitherto unrecognised on this continent; to have geologically mapped a vast tract of interior country between longitudes 133° to 120° and latitudes 32° to 36°; to have classified the marine Tertiaries on the basis of a comparison of their molluscan faunas with existing species; to have brought to notice the first clear evidence of the pre-existence of a glacier at low elevations and the determination of its pre-Miocene age.

Anthropology has received a large share of attention, and

several contributions dealing with the language and customs of some interior and northern races of the Australian aborigine have been published.

Comparative Anatomy is represented by papers dealing with the osteology, myology, and neurology of that most interesting marsupial, *Notoryctes typhlops*.

Lastly, the papers on the chemical properties of certain botanical products are the outcome of careful and original research work.

And now, if your patience be not already exhausted, I will refer to

SOME RECENT ADVANCES TO OUR KNOWLEDGE OF NATURAL HISTORY OF AUSTRALIA.

1. On a Recent Classification of the Australian Land Mollusca.

The appearance of Dr. Cox's Monograph of Australian Land-shells, 1868, with its copious illustrations, brought the study of this department of Natural History within easy reach, and till recently has been a *vade mecum* to Australian workers. But of late years the number of species has been nearly doubled, and important advances have been made in their classification. The helix-like shells which were then known to Cox are included by him under one generic denomination, that of *Helix*, though he employed sectional names in accordance with Pfeiffer's nomenclature, which is based on the classification proposed by Albers and Von Martens. Up to this time the classification was based solely, as regards the Australian forms, on conchological characters, or on characters derived from the study of some special organ. But as far back as 1873, Von Martens ("Critical List of the Mollusca of New Zealand," p. 8) remarked that "this genus (*Helix*), which has been formerly determined by the aspect of the shell only, has during late years been more narrowly circumscribed by the peculiarities of the masticatory and generative organs. As no New Zealand species has hitherto been the subject of anatomical researches, we cannot say how many, and indeed if any, of those which have been described as New Zealand species of *Helix* will remain in that genus as it is now understood." During the years 1880–1882 Professor Hutton communicated several papers to the New Zealand Institute dealing with the anatomy of the land snails of that region, and established some new genera; but later Messrs. Hedley and Suter have separately and conjointly made exact and minute study of the various elements of the morphological characters of the Australasian helicoid snails, and have thereby demonstrated that they exhibit structural dif-

ferences from the typical *Helix* in varying degrees of divergence. A sound arrangement and classification of our numerous species of so-called *Helices* has been long felt, as the classification of Albers, revised by Von Martens, which has been in vogue for the past thirty years, has proved inadequate to the requirements of the systematist. It is, therefore, we hail with satisfaction the appearance of Mr. Pilsbry's "Guide to the Study of Helices," included in vol. IX., second series, of Tryon's Manual of Conchology, 1894–5, which is highly meritorious and will prove of exceeding usefulness. It furnishes us with a classification based on the extensive study of the soft parts—not upon the modification of a single organ, but all the organs of the animal are taken into account.

The author divides the bibliography of the subject into five epochs, commencing with that of Linnæus, and ending with the fifth, introduced by the publication of the second edition of Albers' "Die Heliceen" by Von Martens. Pilsbry modestly subordinates his work to this fifth epoch; but those best familiar with his highly valuable services as a systematist will not doubt the epoch-making importance of his "Guide to the Study of Helices."

It is not desirable to attempt a review of the whole work, but so much of it as concerns the Australian fauna may be summarised. The classification is based upon, to quote the author:—

Organs of protection (shell, mantle, integument of body).
Organs of locomotion (foot, pedal grooves, tail gland).
Organs of reproduction (genitalia, comparative size of eggs, &c.).
Organs of nutrition (jaw, teeth, intestinal tract, kidneys, &c.).
Nervous system, including sense-organs, such as tentacles, &c.

The Australian snails with a helicoid shell belong to the following families:—

I. Without jaw. RHYTIDÆ
II. With jaw.
1. Foot-margin defined by a pedal groove; peristome sharp.
a. Marginal teeth with narrow, elongated, basal plates, and either 1-cuspid and aculeate or bicuspid. Tail gland often present, sole of foot frequently tripartite. ZONITIDÆ.
b. Marginal teeth with wide, short basal plates, with one or several cusps, the outer cusp never elevated on the middle cusp. Shell opaque, usually flame-colored, and rib-striate. ENDODONTIDÆ.
2. No pedal grooves, no tail-gland. Dentition as in *Endodontidæ*. Peristome usually expanded or reflected. HELICIDÆ.

Mr. Pilsbry's work treats only of the *Endodontidæ* and *Helicidæ*, but a companion volume dealing with the other families is promised. To bring this important work more fully to the notice of malacological students in Australia, I have prepared a full synopsis of the genera belonging to the Australian fauna which are comprised in the two families. Without any desire to be critical, I may mention that the limits of the various genera and their mutual relationships may need to be modified with our increasing knowledge of the anatomy of the various species; as it should not be forgotten that more than half of our species are generically located by conchological characters only. The acceptance of Pilsbry's classification opens to us a wide and interesting field of research which is within the reach of each worker, and desiderrated knowledge actually awaits him at his own door. Should any collector, however, think himself unprepared to investigate the anatomy of any snail, he would render good service to malacological science by forwarding his material to Mr. Charles Hedley, of the Australian Museum, Sydney—to whom Mr. Pilsbry acknowledges his great indebtedness in this connection. Moreover, this classification, which expresses the best of our ideas of the relationships of genera and species, provides reliable data for the correlation of local faunæ, and for the solution of various problems connected with geographical distribution and origin.

The Family Endodontidæ is intermediate between *Zonitidæ* and *Helicidæ* in its characters, but is of more primitive origin than either, as indicated by its unspecialised jaw, teeth, genitalia, and shell; indeed, the oldest land-snail, *Zonites priscus* of the Coal Measures of Nova Scotia, is considered by Pilsbry as a probable member of the genus *Pyramidula*. The family has a world-wide range, though very scarce in the tropics. Its present headquarters are in Austro-Polynesia, which furnish 333 of a total of 523 species. Australia and Tasmania possess 78 species distributed in the following genera:—*Laoma* 9, *Flammulina* 22, *Endodonta* 47.

The Family Helicidæ is divided by Pilsbry into five groups, which, arranged in their numerical order, differ from one another in the increasing complexity of the genital organs. Tribe 1, Protogona, with genitalia of the lowest type, is not represented in Australia. Tribe 2, Macroogona, with simple genitalia, but the vas deferens has an epiphallus, contains six Australian and Tasmanian species. Three belong to the monotypic genera *Pedinogyra*, *Anoglypta*, and *Caryodes;* and three to *Panda*, which is exclusively Australian. A still further advance is made in Tribe 4, Epiphallogona, the genital system of which has an epiphallus and flagellum on the penis; but there is no dart sack or other accessory appendages on the female side as in the highest

developed Helices constituting Tribe 5, Belogona, which is absent in Australia. To Tribe 4 belongs the large number of our helix-like shells (144) having an expanded or reflected lip. They are grouped into several genera, based on shell characters only. This group is absent in Tasmania, New Zealand, and New Caledonia, but ranges northward to New Guinea, Southern Asia, and Japan. In America it covers West Indies, Northern South America. The distribution of the Australian examples of epiphallogonous Helicidæ is as follows :—

Chloritis in its wide acceptation extends from North Australia to Southern China, but its typical forms belong to the Malay-Papuan region. The Australian species, 14 in number, are divergent forms, and included in the Section *Austrochloritis*, with which are associated a few Papuan species.

Planispira is an Indo-Malayan and Papuan genus, but the aberrant group, *Angasella*, is restricted to Australia.

Angasella, containing nine species, is characteristic of the Eremian region, whilst the subgroup, *Trachiopsis* (11 species), is confined to the costal tracts of N.W. and N.E.

Thersites is almost wholly Australian, strictly Austro-Papuan, a few species occurring in Papua and adjacent islands.

Thersites (sensu stricto) comprises two species inhabiting the coast-region of subtropic Queensland and New South Wales.

Glyptorhagada contains seven species, confined to South Australia, but dominant in the Eremian region.

Badistes has 42 species distributed throughout the subtropic and temperate parts of the continent, and extending from the coast to the dry interior.

Sphærospira, with 47 species, inhabits Queensland, with a few forms in Papua, being replaced southward by *Badistes* and westward by *Xanthomelon*.

Hadra, as now restricted, consists of three North Queensland species.

Xanthomelon comprises six species, five of which inhabit Queensland and one Arnheim Land.

Rhagada includes ten species belonging to the coast and islands of North Australia, chiefly North-West, and of four species in the islands north of Timor Sea.

Papuina is a large and exclusively arboreal genus inhabiting Papua, the Solomon Archipelago, the Moluccas, but having its southern limit in North Queensland, where it is represented by seven species.

SYNOPSIS OF THE GENERA OF ENDODONTIDÆ.

Group Polyplacognatha.

Jaw composed of numerous squarish plates connected by membrane only; side teeth all bicuspid; no mucus gland at tail.
Shell subtrochiform, keeled, at least in young, usually flame-painted. [Laoma.]
Aperture of shell without teeth or folds.
Section Phrixgnathus.

Group Haplogona.

Jaw composed of overlapping laminæ, partially soldered together or solid, and vertically striated.
Tail with a mucus gland; aperture without folds.
[Flammulina.]
Jaw arcuate, with flat plaits.
Central tooth a short mesocone, ectocones obsolete, laterals with a short ectocone, which disappears on the marginals, leaving a long oblique mesocone only.
s.g. Thalassohelix.
Marginal teeth low, wide, and multicuspid.
s.g. Hedleyconcha.
No mucus gland at tail.
Aperture armed within with teeth or plates.
[Endodonta.]
Shell rounded at periphery, outer lip with folds.
Section Thaumatodon.
Aperture without teeth; shell depressed, convex, flat, or concave. *s.g.* Charopa.

SYNOPSIS OF THE GENERA OF HELICIDÆ.

Sub-Family Macroogona.

Genitalia without flagellum. Eggs or embryonic shell large.
Vagina or spermatheca duct bearing a blind sack; lip of shell narrow or simple.
Shell discoidal. Pedinogyra.
Shell subtrochiform. Anoglypta.
Shell bulimoid.
Upper whorls spirally lirate, with crenulated suture.
Caryodes.
Upper whorls finely beaded or smoothish, suture even.
Panda.

Sub-Family Epiphallogona.

Genital system having an epiphallus and flagellum on penis, and no dart-sack and associated mucus gland.

Penis retractor inserted on epiphallus; penis without appendage.
Apex or whole shell with quincuncially arranged hair-scars; jaw ribbed. [CHLORITIS.]
Surface hairy, or marked with regular series of hair-scars to the apex. *Section* AUSTROCHLORITIS.
Apex not so sculptured.
Shell depressed, last whorl deeply deflexed in front; jaw smooth. [PLANISPIRA.]
Jaw ribbed. *s.g.* ANGASELLA.
Shell of thinner texture, basal lip more or less toothed. *Section* TRACHIOPSIS.
Shell various, generally densely granulated; jaw ribbed. THERSITES.
Shell conoidal, generally banded, the spermatheca having a long duct *s.g.* THERSITES.
Shell lense-shaped. *Section* THERSITES *(s.s.)*.
Shell depressed with conoidal spire, obliquely striate or hirsute. *Section* HADRA.
Shell globose, surface densely granulated all over. *Section* BADISTES.
Shell depressed, keeled, with corrugated and granulated surface. *Section* GLYPTORHAGADA.
Shell globose, surface smooth to the unaided eye. *Section* SPHÆROSPIRA.
Shell depressed globose, calcareous in texture, often multilineate. *s.g.* RHAGADA.
Shell globular, with wide columellar lip; the spermathecal duct short. *s.g.* XANTHOMELON.
Shell trochoidal, thinner, and mostly light colored. PAPUINA.

2. ORDOVICIAN ROCKS IN QUEENSLAND.

At the August meeting in 1893 I exhibited "a species of *Euomphalus* indicative of the Silurian epoch, obtained far to the east of the Macdonnell Range," at 20 miles west from Took's Waterhole in Cairns Range (vol. XVII., p. 354, 1893). The specimen alluded to is the impression of the upper surface of an Euomphaloid shell, which was obtained by Mr. South, Warden of the Gold-fields, then stationed at Alice Springs, at Cairns Range. The fossil was sent to Mr. East, and by him handed to me for determination. Among the fossils collected by me among the Ordovician rocks of the Larapintine region, when attached to the Horn Expedition, are several specimens of an *Euomphalus* or *Oriostoma*-like shell, either identical with or very closely allied to

the species indicated by the impression received from Cairns Range. This fact I communicated to the Government Geologist of Queensland, which indicated the extension of the Ordovician rocks to the borders of that province, and the probability of their occurrence within its boundary. In acknowledging the information, Mr. Jack writes, June 7, 1895 :—"What renders the question of more than usual interest at present is that in some of the bores in the neighborhood of Boulia there are enormous thicknesses of limestone which might possibly be either Ordovician or the older limestones, &c. (probably Cambrian), on which the Silurian lies unconformably. It is quite on the cards that there may be a barrier of Palæozoic rocks extending from the Cairns Range to the Cloncurry."

At a meeting of the Royal Society of Queensland, July 6, 1895, a paper was communicated by the Government Geologist on "Stratigraphical Notes on the Georgina Basin with Reference to the Question of Artesian Water," from which and the discussion which ensued we learn that important advances in stratigraphical geology, as far as Queensland is concerned, are the outcome of the little episode attached to the fossil impression from Cairns Range. Mr. Jack argued that Palæozoic and metamorphic rocks are continuous from the Cairns Range to the Cloncurry area, and consequently that the Lower Cretaceous area at the head of the Georgina River, as shown on the 1892 geological map, must be deleted. These Palæozoic rocks either outcrop or are very close to the surface. He bases these conclusions on the fact that unsuccessful bores have been put down at Carandotta, Chatsworth, Glenormiston, Marion Downs, and four on Tooleybuck Station ; also on the geological investigations in South Australia in the vicinity of the North-western border of Queensland. The only conclusion that can be drawn from this fact is that the country to the north of a line extending from the western boundary of the colony by the tropic of Capricorn to the Georgina River and thence north-eastward (perhaps not in a straight line) to the head of the Warburton River must be regarded as unfavorable for boring for artesian water.

In the discussion which followed, Mr. Gibb Maitland drew attention to the fact that 25,000 square miles of country, believed to be artesian, is now shown to be made up of much older rocks. The discovery of rocks with Silurian or Cambrian fossils on the western border of Queensland is one of the most important stratigraphical facts recently ascertained in Queensland. The oldest fossiliferous beds were, until quite recently, believed to be Devonian, though the occurrence of sedimentary beds lying unconformably beneath these was not unknown. The true age of the limestones of the Cairns Range and those met with in some of

the bores of the Georgina basin still remained unknown, and the solution of this problem would throw a great deal of light upon the physical geology of North-western Queensland.

3. The Age of the Hallett's Cove-Glacier.

The recent discovery that the glacier-path at Hallett's Cove passes beneath the escarpment of the marine Miocene erases an important coordinate factor in the production of the climatic conditions which prevailed during the Diprotodon-period. We cannot shift back the age of the Diprotodon, because the sediments which entomb the marsupial and its associates are certainly post-Miocene. The absence of glacial conditions does not, however, invalidate the argument of high pluvial conditions in Pliocene times, which is based on independent physical evidences. The fact that the glacier-path at Hallett's Cove is pre-Miocene should not force us to accept contemporaneity with the glacier-phenomena at Bacchus Marsh, admittedly of Permo-carboniferous age, which there seems a too-hasty disposition to concede; whilst the more or less incoherent "*till*" at Hallett's Cove is not comparable with the highly indurated glacial sediments at Bacchus Marsh; and, moreover, other interglacial periods are indicated in the stratified rocks of New South Wales and New Zealand. Moreover, the pronounced differences between Eocene and Miocene may lend some argument to uphold the view of a post-Eocene or intra-Miocene age of the Hallett's Cove glacier. The late Mr. G. Scoular (Trans. Roy. Soc., S. Aust. vol. VIII., pp. 36-48, 1886) thought that the more tropical aspect of the Eocene was gradually driven northward by an increase of cold, which finally eventuated in the depopulation of the marine area at the close of the Miocene period. In a certain sense the Eocene fauna is tropical, and it is certainly true that the Miocene fauna has a distinct modern facies, and, relatively to that of the same area before and after, is a much depauperated one. These circumstances may have been produced by a glacier-climate intervening between Eocene and Miocene, and continued into the latter. However, the problem must await solution until the discovery of organic remains in the stratified parts of the "till," which will determine also the condition of its deposition.

4. Jurassic Rocks in New South Wales.

A small patch of shales on the Talbragar River, at about 16 miles NN.E. from Gulgong, was discovered to be plant- and fish-bearing, and was reported on by Geological Surveyor Anderson in 1889. By him these fossiliferous beds were regarded as forming "an isolated lenticular patch in the horizontally-bedded

sandstones similar to the lenticular beds of grey shale which occur in the Hawkesbury sandstone near the coast."

The fish have been described by Mr. A. S. Woodward, of the British Museum, in a Memoir, just published by the Geological Survey of N. S. Wales, and the opinion therein expressed is that the fish are probably of Jurassic, not Triassic, age.

A re-examination of the stratigraphical evidences by Mr. Pittman and Professor David has proved in favor of the conclusions arrived at on palæontological grounds by Mr. Woodward.

The fish-beds differ lithologically from any known rock in the Hawkesbury series; they repose on an eroded surface of the Hawkesbury Sandstone, and the uppermost bed contains pebbles of that formation.

The evidence supplied by the fossil plants, as provisionally interpreted by Mr. R. Etheridge, jun., implies a correlation with the Carbonaceous-series of Victoria and the Ipswich-series of Queensland.

Thus, now for the first time, rocks of Jurassic age are recognised in N. S. Wales.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£	s.	d.	£	s.	d.
Oct. 1, 1894.						
To Balance				162	0	3
" Subscriptions—						
Royal Society...	69	19	6			
Field Naturalists' Section	16	10	0			
Astronomical Section	7	15	0			
				94	4	6
" Donation from Dr. Verco				14	12	0
" Grant from Government				82	14	6
" Sale of Transactions				9	0	0
" Interest				0	6	10
				£362	18	1

Cr.	£	s.	d.	£	s.	d.
By Cost of Transactions—						
Printing and Binding ($1\frac{1}{2}$ years) ...	153	3	6			
Illustrating	67	2	0			
Publishing ($1\frac{1}{2}$ years)	9	13	0			
				229	18	6
" Wages—Caretaker				3	0	0
" Printing, Postage, and Stationery ...				13	17	0
" Library—Binding...				5	0	0
" Grants—Field Naturalists' Section ...	18	0	0			
Astronomical Section	13	0	0			
Microscopical Section	1	19	7			
Malacological Section	2	0	0			
				34	19	7
Sept. 30, 1895.						
" Balance in Savings Bank...				76	3	0
				£362	18	1

Audited and found correct,
D. J. ADCOCK, Auditor.
Sept. 3, 1895.

WALTER RUTT, Treasurer.

DONATIONS TO THE LIBRARY

FOR THE YEAR 1894-95.

TRANSACTIONS, JOURNALS, AND REPORTS

Presented by the respective Societies, Editors, and Governments.

AUSTRIA AND GERMANY.

Berlin—Abhandlungen der Königlich Preussischen Meteorologischen Instituts Ergebnisse beobachtungen, 1890, Heft III. ; do., 1891, 1893, 1894.

——— Zeitschrift der Gesellschaft für Erdkunde, band XXIX., Nos. 3, 4, and 5.

——— Verhandlungen Gesellschaft für Erdkunde, band XXII., Nos. 6, 7, 8, and 9.

——— Sitzungberichte Königlich Preussischen Akademie der Wissenschaften zu Berlin, Nos. 39 to 53, 1893 ; 1 to 53, 1894 ; 1 to 25, 1895.

Gottingen—Nachrichten von der K. Gesellschaft der Weissenschaften u. d. Georg-August Universitat, Nos. 3 and 4, 1894; No. 1, 1895; Heft 1 and 2, 1895.

Halle—Leopoldina, Heft 28 and 29. Nova Acta der K. Leopold-Carol Deut Akad der Naturforscher ; Band LIX, No. 1 : LXI., No. 4.

Munich—Sitzunberichte der Mathematisch — Physikalischen Classe der K. B. Akad der Wissenschaften zu Munichen, 1894, Heft 4 ; 1895, Heft 1.

Vienna—Annalen des K. K. Naturhistorischen Hofmansmuseum, Band IX., Nos. 1 and 2.

——— Kaiserliche Akademie der Wissenschaften in Wien, 1894, No. 22 ; Nos. 1 and 3 of 1895 ; No. 8 of 1895.

——— Verhandlungen der K. K. Geologischen Reichanstalt, Nos. 10 to 13, 1894 ; Nos. 1 to 18, 1894 ; Nos. 1 to 7, 1895.

——— Verhandlungen K. K. Zoologisch-Botanischen Gesellschaft in Wien, XLV. Band, 1 to 7 Heft ; XLIII. Band, 3 and 4 quartal ; XLIV. Band, 1 and 2 quartal.

——— Sitzung der Mathematisch - naturwissenschaftlichen Classe Kaiserliche Akdad der Wissenschaften, Nos. 24 to 27.

Vienna—K. K. Gradmessungs-Bureau, Astronomische Arbeiten, II. Band.

——— Gradmessung Commission Protokoll, 11 and 13, April, 1894.

Würzburg — Sitzungerberichte der Physikalisch-medicinischen Gesellschaft, 1894, Nos. 1 to 10.

AUSTRALIA AND NEW ZEALAND.

Adelaide—Government Geologist—Annual Report, 1894.

Brisbane—Royal Society of Queensland, Vol. X., 1892 and 1894; Index, Vols. VII., VIII., and IX.; Proceedings, vol. XI., part 1.

——— Geological Survey Office — Artesian Water in the Western District of Queensland.

——— Department of Agriculture—Botany Bulletins, 9, 10, and 11; Botany Abridged (pamphlet).

Ballarat—School of Mines—Calendar, 1895.

Geelong—Gordon Technical College—Annual Report, 1894.

——— Geelong Naturalist, March, 1894; Sept., 1894; Dec., 1894; March, 1895; June, 1895.

Perth—Mining Handbook.

Melbourne—Victorian Naturalist, vol. XI., Nos. 6 to 12; vol. XII., Nos., 1 to 5.

——— Royal Society of Victoria, Proceedings, vol. VII., N.S.

——— Department of Mines—Reports on the Victorian Coalfields, No. 3; Annual Report, 1893 and 1894; Report on Loss of Gold in the Reduction of Auriferous Veinstone in Victoria.

Wellington, New Zealand. — Transactions and Proceedings, vol. XXVII.

Sydney—Records of the Australian Museum, vol. II., No, 6, and Report for 1894.

——— Linnean Society—Proceedings, vol. IX., parts 2, 3, and 4; vol. X., part 1; Abstract of Proceedings, 1895.

——— Royal Society, Proceedings, vol. XXVIII., 1894.

——— Department of Mines—Records of Geological Survey of N.S. Wales, Vol. IV., parts 2 and 3, 1894; Catalogue of Works; Reports and Papers on the Anthropology, Ethnology, and Geological History of the Australian and Tasmanian Natives; Flowering Plants and Ferns of N.S.W., part 1; Annual Report, 1894.

——— Australasian Association for the Advancement of Science, vol. V.

——— Sydney Observatory—Results of Rain, River, and Evaporation Observations made in N.S. Wales during 1893.

Sydney—University Calendar, 1895.
——— Agricultural Gazette of N.S. Wales, vol. V., parts 9 to 12; vol. VI., parts 1 to 8.

CANADA.

Halifax—Proceedings Nova Scotian Institute of Natural Science, vol. I., part 3.
Montreal—Canadian Record of Science, No. 8.
——— Geological Survey of Canada, Annual Report N.S., vol. VI.

FRANCE.

Caen—Bulletin de la Société Linneenne de Normandie, vol. VII., series 4; vol. VIII., series 4.
Paris—Annuaire Géologique Universel, tome X., 1, 2, 3 fas.; tome IX., extrait.
—— Bulletin des Sceances Société Entomologique, Nos. 14 to 20, 1894; Nos. 1 to 14, 1895. Annals of above Society for 1893, Vol. LXII.
—— Feuilles des Jeunes Naturalistés, series III., Nos. 287 to 299.
—— Société de Geographie, Comptes Rendus des Seances, Nos. 16 and 17, 1894.
—— Bulletin du Muséum d' Histoire Naturelle, Nos. 1, 2, and 3, 1895.
Marseilles—Annales de Faculté des Sciences, tomes I., II., III., and IV.

GREAT BRITAIN AND IRELAND.

Belfast—Report and Proceedings Belfast Natural History and Philosophical Society, 1893 and 1894.
Dublin—Royal Irish Academy, Transactions, vol. XXX., parts 13 and 14; Proceedings, Vol. III., No. 3. Cunningham Memoirs, No. 10.
Edinburgh—Royal Physical Society, Proceedings, 1893 and 1894.
Kew—Bulletin, 1894.
London—Journal Royal Microscopical Society, parts 4 to 6, 1894 parts 1 to 4, 1895.
——— British Museum, Catalogue of Birds, vol. XXIII.
——— Linnean Society, List of Members; Proceedings, 1895.
——— Royal Colonial Institute, Catalogue of the Library.
——— Entomological Society of London, Transactions, 1894.
——— Royal Society, Proceedings, vol. LVI., Nos. 336 to 350.
Leeds—Journal of Conchology, vol. VII., No. 12; vol. VIII., Nos. 1, 2, and 3.
Manchester—Journal Manchester Geographical Society, Vol. IX., Nos. 10 and 12; vol. X., Nos. 1 to 9.

Mancheoter—Manchester Field Naturalists and Archæologists Society, Report and Proceedings, 1893 and 1894.
———— Memoirs and Proceedings Manchester Literary and Philosophical Society, vol. VIII., Nos. 3 and 4; Vol. IX., Nos. 1 and 2.
———— Manchester Geological Society, Transactions, vol. XXII., parts 19 to 21; vol. XXIII., parts 1 to 10.

INDIA.

Calcutta—Indian Museum, Vol. III., Nos. 4 and 5; Catalogue of Coins, parts 1 and 2; Descriptions of Nine Species of Squillidæ.
Madras—Government Museum Bulletin, Nos. 1, 2, and 3.

ITALY.

Milan—Atti Società Italiana Scienza Naturali, vol. XXXV., Nos. 1 and 2.
——— Monograph of the Rapacious Birds of Italy.
——— Bolletino Società Entomologica Italiana, trimestre III. and IV.
Pisa—Atti Società Toscana de Scienza Naturali, vol. IX., pp. 134 to 241.
Turin—Bolletino Musei Zoologia ed Anatomia Comparata, Università di Torino, vol. IX., Nos. 166 to 209.

JAVA.

Batavia—Naturkundig Tigdschrift voor Nederlandsch-Indiê, deel LIV.

JAPAN.

Tokio—Journal College of Science, Imperial University, vol. VII., parts 2 to 5; vol. VIII., part 1. Calendar, 1893-94.

MEXICO.

Mexico—Memoirs de la Sociedad Scientifica, tome VII., Nos. 11 and 12.

NORWAY AND SWEDEN.

Bergen—Bergens Museum, Aarbog for 1893.
Stavanger—Stavanger Museum, Aarsberetnung for 1893.
Stockholm—Geologiska Föreningens, band XVI., 1894.
Trondjem—Société Royale Norwégienne des Sciences, skrifter, 1893.
Upsala—Bulletin of Geological Institution, University of Upsala, vol. II., part 1, No. 3.

Russia.

Moscow—Bulletin de la Société Impériale des Naturalistes, 1894, Nos. 2, 3, and 4; 1895, No. 1.

St. Petersburg—Société Impériale Mineralogique, vol. XXXI., series 2.

———— Bulletin du Comité Geologique, 1893, tome XII., Nos. 8 and 9, 1893, supplement to tome XIII.; 1894, tome XIII., Nos. 1 to 7. Memoirs. vol. VIII., Nos. 2 and 3; vol. IX., No. 3; vol. XIV., No. 1.

———— Bulletin de l'Acadamie Impériale des Sciences, vol. I., No. 4; vol. V., tome II., Nos. 1 to 4. Memoirs, tome XLI., Nos. 2 to 9, tome XXXIX., tome XLII., Nos. 1 to 11; N.S. IV. (XXXVI.), Nos. 1 and 2.

Switzerland.

Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles, vol. XXX., Nos. 115 and 116; vol. XXXI., No. 117.

Geneve—Société de Physique et d'Histoire Naturelle, Comptes Rendus des Séances, vol. XI.

South America.

Rio de Janiero—Annales de l'Observatoire Imperial for 1893.

Buenos Aires—Boletin de la Academia Nacional de Ciencas, tome XII., parts 2, 3, and 4; tome XIII., parts 1 to 4; tome XIV., part 1.

United States.

Berkly, California—Bulletin, Department of Geology, vol. I., Nos. 1 to 7; Lherzolite = Serpentine and asssociated rocks of the Potrero, San Francisco.

Baltimore—John Hopkins University Circulars, vol. XIV., Nos. 116 to 120. John Hopkins University Studies, series X., part 12; series XI., parts 1 to 12; series XII., parts 1 to 7.

———— American Chemical Journal, vol. XIV., No. 8; vol. XV., Nos. 1 to 8; vol. XVI., Nos. 1 to 6.

Boston—Proceedings American Academy Arts and Sciences, vol. XX.

——— Proceedings Boston Society of Natural History, vol. XXVI., parts 1, 2, and 3. Memoirs Boston Society of Natural History, vol. VI., No. 11; vol. III., No. 15.

Cincinnati—Cincinnati Society of Natural History, vol. XVI., Nos. 2, 3, and 4; vol. XVII., Nos. 1, 2, and 3.

Cambridge—Bulletin Museum Comparative Anatomy, Harvard, Annual Report, 1894; vol. XXV., Nos. 7 to 12; vol. XVI., No. 15; vol. XXVII., No. 1; Vol. XXVIII., No. 1.

——— Psyche, vol. VII.; Nos. 222 to 232.

Meriden, Conn.—Transactions of the Meriden Scientific Association, vol. V.

Massachussetts—Tufts College Studies, Nos. 2 and 3.

New York—Annals of the New York Academy of Sciences, vol. VI., index; vol. VIII., No. 4; vol. VII., Nos. 6 to 12.

——— Journal New York Microscopical Society, vol. X., No. 4; xol. XI., Nos. 1, 2, and 3.

——— (Albany) New York State Museum, 45th Annual Report, 1891; 46th do., 1892.

Philadelphia—Proceedings of the Academy of Natural Sciences, parts 1, 2, and 3, Jan. to Dec., 1894; part 2, May to Sept.

St. Louis—Missouri Botanic Gardens, Report, 1894.

——— Academy of Sciences, vol. VI., Nos. 9 to 17.

Salem—Bulletin Essex Institute, vol. XXV., Nos. 4 to 12; vol. XXVI., Nos. 1, 2, and 3.

——— Proceedings American Association for Advancement of Science, 1893.

Sacramento—California State Mining Bureau—Gas and Petroleum Yielding Formations of the Central Valley of California; 12th Report of the State Mineralogist.

San Francisco—Proceedings California Academy of Sciences, vol. IV., part 1.

Washington—Memoirs of the National Academy of Sciences, vol. VI.

——— United States Geological Survey—Tertiary Rhyncophorus Coleoptera, "Scudder;" Manual of Topographic Methods, "Gannett;" Penokee Iron-bearing Series of Michigan and Wisconsin, "Irving and Van Hise;" Mineral Resources of the United States, 1892 and 1893; Annual Report, 1890-91, parts 1 and 2; do., 1891-92, parts 1, 2, and 3; Bulletin of the U.S. Geological Survey, Nos. 97 to 117.

——— Department of Agriculture, Washington—Report of the Statistician, Nov., 1894; Dec., 1894; April, 1895; June, 1895. Hog Cholera and

Swine Disease; Washed Soils; Barnyard Manure.

Washington—Smithsonian Institution—Annual Report, June 30, 1892; Report of the U.S. National Museum, 1891; Annual Reports, 1891 and 1892; 9th Annual Report Bureau of Ethnology; Report of the Section of Agriculture, 1893; Bibliography of the Salishan Languages.

FROM THE AUTHORS.

A. Liversidge, M.A., F.R.S.—

Notes on some Australasian and other Stone Implements.

Boleite, Nantokite, Kerargyrite, and Cuprite from Broken Hill, N.S. Wales.

Sir F. von Mueller, F.R.S., &c.—

Select Extra-Tropical Plants.

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1895.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows. Those marked with an asterisk have contributed papers published in the Society's Transactions.

Any changes in the addresses should be notified to the Secretary.

Date of Election.

HONORARY FELLOWS.

1857. BARKELEY, SIR HENRY, K.C.M.G., K.C.B., F.R.S., Royal Colonial Institute, London.
1893. COSSMANN, M., Rue de Maubeuge, 95, Paris.
1876. ELLERY, R. L. J., F.R.S., F.R.A.S., Government Astronomer Victoria, The Observatory, Melbourne, Victoria.
1890. *ETHERIDGE, ROBERT, Palæontologist to the Geological Survey of New South Wales, Sydney.
1853. GARRAN, A., LL.D., Sydney, New South Wales.
1893. GREGORIO, MARQUIS DE, Palermo, Sicily.
1855. HULL, H. M., Hobart, Tasmania.
1878. JERVOIS, SIR W. F. D., K.C.M.G., C.B., F.R.S., Ex-Governor of South Australia, London, England.
1855. LITTLE, E.
1879. *MUELLER, BARON F. VON, K.C.M.G., F.R.S., M. and Ph.D., F.G.S., F.R.G.S., F.C.S., C.M.Z.S., &c., &c., Government Botanist, Melbourne, Victoria.
1876. RUSSELL, H. C., B.A., F.R.S., F.R.A.S., Government Astronomer New South Wales, Sydney, N.S.W.
1894. *WILSON, J. T., M.D., Professor of Anatomy Sydney University.

CORRESPONDING MEMBERS.

1881. BAILEY, F. M., F.L.S., Colonial Botanist, Brisbane, Queensland.
1881. *CLOUD, T. C., F.C.S., Manager Wallaroo Smelting Works, South Australia.
1888, *DENNANT, JOHN, F.G.S., F.C.S., Inspector of Schools, Russell-street, Camberwell, Melbourne, Victoria.
1880. *FOELSCHE, PAUL, Inspector of Police, Palmerston, Northern Territory, Australia.
1881. GOLDSTEIN, J. R. Y., Melbourne, Victoria.
1880. *KEMPE, REV. J., Australia.
1893. *MCKILLOP, REV. DAVID, S.J., Superior Daly River Mission, Northern Territory.
1892. *MAIDEN, J. H., F.L.S., F.C.S., Curator Technological Museum, Sydney, N.S.W.
1888. *MASKELL, W. M., Wellington, New Zealand.
1886. NICOLAY, REV. C. G., Fremantle, Western Australia.
1880. *RICHARDS, MRS. A., Georgetown, South Australia.
1892. *SCHULZ, REV. LOUIS.
1883. *STIRLING, JAMES, Assistant Geological Surveyor, Victoria.
1893. *STRETTON, W. G., Palmerston, Northern Territory.

FELLOWS.

1887. Adcock. D. J., Adelaide, S.A.
1874. Angas, J. H., Adelaide, S.A.
1895. Ashby, Edwin, Adelaide, S.A.
1887. Bagot, John, Adelaide, S.A.
1893. *Bednall, W. T., Adelaide, S.A.
1887. *Blackburn, Rev. Thomas, B.A., Woodville, S.A.
1884. Boettger, Otto, Adelaide, S.A.
1886. *Bragg, W. H., M.A., Professor of Mathematics, University of Adelaide, S.A.
1882. Brown, L. G., Adelaide, S.A.
1883. *Brown, H. Y. L., F.G.S., Government Geologist South Australia, Adelaide.
1893. Brummitt, Robert, M.R.C.S., Eng., Kooringa, S.A.
1884. Bussell, J. W. F.R.M.S., North Adelaide, S.A.
1888. Chapman, R. W., M.A., B.C.E., Lecturer on Mathematics and Physics University of Adelaide, S.A.
1879. *Cleland, W. L., M.B., Ch.M., J.P., Assistant Colonial Surgeon, Resident Medical Officer Parkside Lunatic Asylum, Lecturer on Materia Medica University of Adelaide, Parkside, S.A.
1876. (L) Cooke, E., Commissioner of Audit South Australia, Adelaide, S.A.
1895. Cooke, John H., Adelaide, S.A.
1880. Cox, W. C., Semaphore, S.A.
1887. *Dixon, Samuel, Adelaide, S.A.
1876. Dobbie, A. W., Adelaide, S.A.
1893. Dudley, U.
1890. *East, J. J., F.G.S. (Corresponding Member, 1884.)
1871. Elder, Sir Thomas, K.C.M.G., Adelaide, S.A.
1886. Fleming, David, Adelaide, S.A.
1882. Fowler, William, Melton, Y.P., S.A.
1889. Fraser, J. C., Adelaide, S.A.
1880. *Goyder, George, Jun., F.C.S. Government Analyst South Australia, Adelaide, S.A.
1890. Gray, Rev. William, Mount Barker, S.A.
1887. Grasby, W. C., F.L.S., Agricultural College, Roseworthy, S.A.
1882. Henry, Alexander, M.D., Adelaide, S.A.
1891. *Holtze, Maurice, F.L.S., Director Botanic Gardens, Adelaide (Corresponding Member, 1882), Adelaide, S.A.
1883. *Howchin, Walter, F.G.S., Goodwood, S.A.
1893. James, Thos., M.R.C.S., Eng., Moonta, S.A.
1891. Johnson, J., M.D., F.R.C.S., Medical Officer Mount Gambier Hospital, Assistant Colonial Surgeon, Mount Gambier, S.A.
1853. (F) Kay, Robert, General Director and Secretary S.A. Public Library, Museum, &c., Adelaide, S.A.
1894. Kershaw, James A., Entomologist National Mnseum, Melbourne.
1884. Lendon, A. A., M.D., M.R.C.S., Lecturer on Forensic Medicine and on Chemical Medicine University of Adelaide, Hon. Physician Adelaide Hospital and Children's Hospital, North Adelaide, Adelaide, S.A.
1866. Lloyd, J. S., Adelaide, S.A.
1888. *Lower, O. B., F.Ent.S., Parkside, Unley, S.A.
1885. *Lucas, R. B., Adelaide, S.A.
1874. *Magarey, Hon. S. J., M.D., M.L.C., Adelaide, S.A.
1874. Mayo, G. G., C.E., Adelaide, S.A.
1882. *Meyrick, E. T., B.A., Ramsbury, Hungerford, Wilts, England.
1888. Molineux, A., F.L.S., Secretary Central Agricultural Bureau South Australia, Kent Town, S.A.

1859. (L) MURRAY, DAVID, Adelaide, S.A.
1884. MUNTON, H. S., Brighton, S.A.
1893. PERKS, R. H., M.D., F.R.C.S., Eng., Birksgate, S.A.
1883. PHILLIPS, W. H., Adelaide, S.A.
1886. POOLE, W. B., Adelaide, S.A.
1895. RAMAGE, REV. GRANVILLE, Norwood, S.A.
1885. *RENNIE, H. E., M.A., D.Sc., F.C.S., Professor Chemistry University of Adelaide.
1891. ROGERS, R. S., M.D., Adelaide, S.A.
1876. *RUTT, WALTER, C.E., Adelaide, S.A.
1891. SELWAY, W. H., JUN., Adelaide, S.A.
1886. SCOTT, JAMES L., Hyde Park, S.A.
1893. SIMSON, AUGUSTUS, Hobart, Tasmania.
1857. SMEATON, THOMAS D., Blakiston, Little Hampton, S.A.
1871. SMITH, ROBERT BARR, Adelaide, S.A.
1881. *STIRLING, EDWARD C., C.M.G., M.A., M.D., F.R.S., F.R.C.S., Lecturer on Physiology University of Adelaide, Hon. Director S.A. Museum, Hon. Surgeon Adelaide Hospital, Adelaide, S.A.
1893. *STREICH, VICTOR, F.G.S.
1876. *TATE, RALPH, F.L.S., F.G.S., Professor of Natural Science University of Adelaide
1886. *TEPPER, J. G. O., F.L.S., Entomologist S.A. Museum (Corresponding Member, 1878), Adelaide, S.A.
1894. *TURNER, A. JEFFERIS, M.D., Brisbane.
1889. VARDON, JOSEPH, J.P., Adelaide, S.A.
1878. *VERCO, JOSEPH C., M.D., F.R.C.S., Lecturer on the Principles and Practice of Medicine and Therapeutics and on Clinical Medicine University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1883. WAINWRIGHT, E. H., B.Sc., St. Peters College, S.A.
1878. WARE, W. L., Adelaide, S.A.
1879. WAY, EDWARD W., M.B., M.R.C.S., Lecturer on Obstetrics and Diseases Peculiar to Women and Children University of Adelaide, Hon. Physician Adelaide Hospital, Adelaide, S.A.
1859. WAY, SAMUEL J., D.C.L., Chief Justice and Lieutenant-Governor South Australia, Adelaide, S.A.
1882. *WHITTELL, HORATIO, M.D., M.R.C.S., F.R.M.S., President Central Board of Health and City Coroner Adelaide, Adelaide, S.A.
1886. WILSON, JOHN F.E.T.S., Goodwood, S.A.
1886. *ZIETZ, A., F.L.S., Assistant Director S.A. Museum, Adelaide, S.A.

ASSOCIATE.

1895. CLELAND, JOHN B., Parkside, S.A.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

Twelfth Annual Report of the Committee, Being for the Year ending 30th September, 1895.

Evening Meetings.—Eight evening meetings have been held, at which the attendance has been very satisfactory, the average being greater than for many years past. The most noteworthy feature was the conversazione in October, 1894, which was the most successful and interesting gathering of the kind yet held by the Section, besides being on a more extensive scale than any of its predecessors. The special efforts made to ensure this result were evidently much appreciated by the large number of members and visitors who attended. A new feature of the winter session was the introduction of the "Question Box," when questions in Natural History subjects were asked and answered, and afterwards discussed by the members. Much information of a popular character was by this means obtainable. Papers or addresses have been contributed by Dr. R. H. Perks, F.R.C.S., and Messrs. R. Griffiths, J. W. Bussell, A. F. Robin, J. W. Mellor, J. G. O. Tepper, F.L.S., and T. D. Smeaton. The exhibits have covered a wide range both as to locality and nature of specimens. The Section has agreed to take part in the combined conversazione of Literary, Scientific, and Art Societies to be held in November next.

Excursions.—Eight excursions have been held, most of which have been well attended, and some have proved unusually pleasant outings. About 40 members and friends journeyed to Mount Lofty at the invitation of Mr. A. S. Magarey, chiefly to see the Recreative Reserve near that station, whilst interesting visits to Blakiston and Upper Sturt have been made. Hallett's Cove has been revisited, in order to inspect the fresh developments recently made there, and a dredging trip was also included in the outings. The weather on more than one occasion prevented some fixtures being carried out, and an excursion planned for the Burra (September 1), with the view of covering entirely

new ground, fell through owing to lack of numbers. The members of the Section have been most kindly entertained at excursions during the year by Dr. E. C. Stirling, F.R.S., &c., and Messrs. T. D. Smeaton, J.P., and J. H. Symon, Q.C.

Protection of our Native Fauna and Flora.—A separate report from the Native Fauna and Flora Protection Committee states what has been done in this direction during the past year.

Proceedings.—It has been found impracticable as yet to issue the "Proceedings" of the last two and the current years, but it is hoped that ere long the continuity of our printed transactions will be restored.

Financial.—From the accompanying statement of accounts it will be seen that the amount received from subscriptions has been greater than last year, and that the expenditure, chiefly through the expenses of the conversazione (October, 1894), coming into the current financial year have also been larger. In other respects the work of the Section has been carried on with due regard to economy.

Membership.—There have been twelve admissions to the Section during the year, whilst fifteen names have been removed from various causes, the number now on the roll being eighty-seven.

R. H. Perks, Chairman.
W. H. Selway, Jun., Hon. Sec.

Adelaide, 16th September, 1895.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for the year 1894-95.

Dr. Receipts.	£	s.	d.
To Balance brought forward	1	16	10
" Grants from Royal Society	18	0	0
" Subscriptions	16	10	0
	£36	6	10

Cr. Disbursements.	£	s.	d.
By Postages and Sundries	3	15	0
" Conversazione	9	4	11
" Printing	3	5	0
" Advertising	1	12	6
" Attendance	1	5	0
	£19	2	5
" Subscriptions, as per contra, handed over to Royal Society	16	10	0
" Balance in Hand	0	14	5
	£36	6	10

Audited and found correct,

THOS. EVANS, F.S.A.I.A.
THOS. FABIAN, } Auditors.

Adelaide, September 16, 1895.

W. H. SELWAY, Jun., Hon. Secretary and Treasurer.

ASTRONOMICAL SECTION

OF THE

Royal Society of South Australia.

THIRD ANNUAL REPORT.

Since presenting the last Annual Report this Society has endeavored to forward the object for which it was founded, viz., the encouragement of a popular interest in the science of astronomy.

The roll of membership has kept up, and is (notwithstanding unavoidable removals) slightly over that of last year.

During the past twelve months five general meetings have been held, and the Committee met six times for the transaction of business.

In the early part of the session a new departure was made by the introduction of a question box, the contents of which have provoked discussion on a variety of subjects, as "The effects of the tides on the earth's rotation," "Non-luminous bodies in space," "The methods by which terrestrial gravity is ascertained," "The latest method for determinating difference in longitude," "The refractor and reflector telescopes," "The best method of constructing a planisphere," "The motion of the stars in the line of sight as measured by the spectroscope," "Method of determining the right ascension and declination of stars," "On the changes of gravity at different altitudes," "The dividing powers of the refractor telescope," "The way of deducing the progressional motion of the perigree from the time of perihelion passage and the longitude as given in the Nautical Almanac," "Why the moon appears larger on the horizon than when at its highest altitude," and "Why stars scintillate and the planets do not."

In November last Mr. J. W. H. Hullett gave a paper on the "Determination of the Orbits of Comets and their Elements."

The astronomical notes have been published monthly and a copy sent to every member.

Adopted at annual meeting held at Adelaide Observatory 24th September, 1895.

C. Todd, President.
W. E. Cheesman, Hon. Secretary.

ASTRONOMICAL SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Disbursements for Year 1894-5.

Dr	£	s.	d.	Cr.	£	s.	d.	£	s.	d.
To Balance in hand	0	3	9	By Printing Monthly Notes	2	8	0			
" " Bank	7	19	3	" Stationery and Type-writing	0	11	0			
" Grants from Royal Society	13	0	0	" Postage	2	4	7			
" Subscriptions	7	15	0	" Blackboard and Guard-book	1	10	0			
" Interest	0	5	8					6	13	7
				" Subscriptions paid over to the Royal Society				9	12	6
				" Savings Bank				11	4	11
				" Balance in hand				1	12	8
	£29	3	8					£29	3	8

Audited and found correct,
RICHD. GRIFFITHS.
Sept. 23, 1895.

C. TODD, President.
W. E. CHEESMAN, Hon. Treasurer.

MALACOLOGICAL SECTION

OF THE

Royal Society of South Australia.

FIRST ANNUAL REPORT, 1895.

The preliminary meeting was held on September 20th, 1894, when it was resolved—(1) That the name of the Section be the Malacological Section of the Royal Society of South Australia. (2) That the annual subscription from members of the Royal Society shall be five shillings, and from others, if living within a radius of ten miles of Adelaide, shall be ten shillings; if beyond that distance, five shillings. (3) That meetings shall be held on the fourth Tuesday in each month. (4) That the Section shall annually elect its Chairman and Secretary; that the whole Section shall at present constitute its Executive Committee. (5) That a report of the proceedings of the Section, and original papers by its members, approved by the Council of the Society, shall be printed in the Transactions of the Royal Society, and that a copy of such report and papers shall be distributed to each member of the Section. The Section will secure about 50 copies of all papers printed, as a stock for sale to future members of the Section and others.

It was further resolved that the nomination of applicants for membership shall take place at an ordinary meeting, and the election at the next meeting. This shall be by ballot, and one black ball in three shall exclude the applicant.

Two new members have been elected, Mr. M. Maughan and Mr. A. Gosnell.

Twelve meetings have been held, and the same officers were at the last meeting elected for another year.

The work done has consisted chiefly in a critical revision of the Marine Gasteropods of South Australia, taking as a basis for discussion Mr. Adcock's List of Species of Aquatic Mollusca, 1893; the first 84 of which have been examined. The results

have been, in part, embodied in a paper by the Chairman on a Revision of the Marine Gasteropods of South Australia, printed in part i., vol. XIX. of the Transactions of the Royal Society, and it is anticipated that a series of similar papers will follow.

Prof. Tate exhibited a new species of Arcoperna, a worn specimen of *Voluta Roadknighti*, and an example of *Solarium Reevei* from Tasmania; collected by Mr. May.

Dr. Perks showed *Mesodesma erycina*, Lam., from the Grange Beach, St. Vincent Gulf, and Mr. Bednall recorded it from Aldinga.

Mr. Bednall—Specimens of *Trophon squamosissima*, Ten.-Woods, allied to, if not a variety of, *T. Hanleyi* from South Australia and Tasmania.

Mr. Adcock—Examples of *Clanculus Aloysii*, Ten.-Woods, from the South-East, and a *Crepidula aculeata* found by Mr. Ashby at Middleton.

ROYAL SOCIETY OF SOUTH AUSTRALIA—MALACOLOGICAL BRANCH.

Balance-Sheet, 1894-5.

Receipts	£	s.	d.	Payments.	£	s.	d.
To Subscriptions received	2	10	0	By Caretaker	1	0	0
" Grant from Royal Society	2	0	0	" In hand for Current Expenses	1	0	0
				" Balance	2	10	0
	£4	10	0		£4	10	0

JOS. C. VERCO, Chairman.

ROBERT PULLEINE, Hon. Sec. and Treasurer.

GENERAL INDEX.

[The species and genera, the names of which are printed in italics are described as new.]

Aborigines, circumcision-rite, 123 ; languages of, 1.
Agonochila *Koebelei*, 201; *stictica*, 201.
Agrypnus Mastersi, 47.
Aire-river, tertiary strata at, 115.
Alethopteris, species of, 143.
Amphibolite, altered, 73.
Ananca *Zietzi*, 55.
Anthrophyopsis, species of, 141.
Aphileus *ferox*, 50.
Aphodius *callabonnensis*, 32.
Apolyta, *bicolor*, 152 ; *marginata*, 152 ; *pallescens*, 152 ; pellucida, 151.
Arca Domingensis, plicata, 261
Astræus Meyricki, 45.
Atænius *Zietzi*, 32.
Augen-gneiss, 74.
Axinite amphibolite, 72.
Barronica scorpio, 202.
Berosus *munitipennis*, 30.
Biotite granites, 75, 76, 77.
Blackburn, Rev. T., on Australian Coleoptera, 27, 201.
Blattariæ, on Australian species of, 19, 146.
Bubastes splendens, 46.
Bucolus *frater*, 255 ; *posticalis*, 256.
Cairnsia Cowleyi, 224.
Callabonica propria, 36.
Cape Otway, tertiary strata at, 109.
Carabidæ, notes on, 27 ; 124.
Carboniferous Foraminifera, 194.
Catocalephe minans, 220.
Catypnes *planicollis*, 58.
Ceratognathus *Gilesi*, 215.
Cerebrum of *Notoryctes typhlops*, 167.
Choristima Kershawi, 165.
Chrysobothris *interioris*, 46.
Circumcision, treatment after, 123.
Coelophora *nigro-vittata*, 237.
Coleoptera, descriptions of species of, 27 ; 124 ; 201.
Colpochila *palpalis*, 35.
Cornuspira *Schlumbergi*, 195.
Cranterophorus clavicornis, 232.
Crassatella *micra*, 93 ; *producta*, 92.
Cretaceous Foraminifera, 198.
Cryptodon *subflexuosus*, 262.
Cubicorhynchus *taurus*, 220.
Cyanides, on some reactions of, 25.
Cycloneda *barronensis*, 238.
Cycloscymnus *concolor*, 254.
Dahl, Knut, treatment after circumcision, 123.
Daly River tribe, 123.
Dennant, J., Correlation of Marine Tertiaries, 108.
Dineutes *inflatus*, 28.
Diorite, altered, 73.
Dryscarasphorus laticeps, 326.
Ectobia *margarita*, 148 ; *minima*, 147 ; *sublucida*, 147.
Eleothreptus punctulatus, 235.
Eonius atrofrons, 22 ; *callabonnensis*, 21.
Ephidonius *parvicollis*, 52.
Epidote rock, 73.
Epilachna *Terræ-reginæ*, 237.
Epilampra *perplexa*, 156.
Episcaphula *brevicornis*, 227 ; *foveicollis*, 227 ; *nigrofasciata*, 226.
Equisetum, species of, 139.
Etheridge, R., jun., Plant-remains from the Leigh Creek Coalfield, 138.
Eupœcila balteata, 219.
Flora of extra-tropical S. Australia, 79.
Foraminifera, Carboniferous, 194, and Cretaceous, 198.
Fornax *coloratus*, 219.
Fossils of the Cape Otway tertiary beds, 111.
Frenelopsis (?), species of, 144.
Frondicularia *Woodwardi*, 197.
Garnetiferous gneiss, 74, 77.
Glacial features at Hallett's Cove, 61.
Goyder, G. A., on some reactions of Double Cyanides, 25.
Granite, 76.
Gymnoscymnus *explanatus*, 240.
Hallett's Cove, glacial features at, 61.
Haplophragmium *australis*, 198.
Helæus interioris, 51.
Hermit Hill tribe, 123.
Heteronyx *suturalis*, 37.
Homotrysis *arida*, *callabonensis*, *sitiens*, 53.
Horonotus optatus, 40.
Howchin, W., Glacial Features at Hallett's Cove, 61 ; New Species of Carboniferous, 191, and Cretaceous Foraminifera, 198.
Hydrochus *Palmerstoni*, 29.
Hypharpax *interioris*, 135.
Hyphoryctes maculatus, 37.
Idiophyes brevis, 234.
Illæna exilis, 59.
Inman Valley shale, 68.
Ischioplites metutus, 59.
Ischiopsopha *Bourkei*, 44.
Ischnoptera australis, 154 ; *brumneonigra*, 155 ; longiuscula, 154.
Lacon *Zietzi*, 48.
Laius *eremita*, 51.
Lake Callabonna, Carabidæ from, 124.
Latirus *aurantiacus*, 79; *Pulleinei*, 90.
Leigh Creek Coal-field, plant-remains from, 138.
Lepidophora furcata, 20.
Liparetus *aridus*, *distinctus*, *melanocephalus*, 34.
Lipernes *creber*, *gibbosus*, 240.

Litochrus *coloratus*, 207; *Koebelei*, 208; *major*, 208; *noteroides*, 208; *pulchellus*, 207; *tinctus*, 208.
Loxandrus *australiensis*, 128.
Macroura Baileyi, 31.
Marine Mollusca of S. Australia, new species of, 184.
Marine Tertiaries of Australia, correlation of, 108.
Metoponcus *cairnsensis*, 204.
Monocrepidius *commodus*, 48; *inamœnus*, 49.
Moulden, J. C., South Australian petrology, 70.
Murex *robustus*, 85; *Tatei*, 84, et spp. 95.
Muricidæ of South Australia, 95.
Native Tongues in the neighborhood of Port Darwin, 1.
Neda bicolor, 239.
Neocarenum *Blackburni*, 124.
Neostenus *spinipennis*, 223.
Nocar debilis, 55.
Nodosaria *Irwinensis*, 196.
Notoberosus Zietzi, 30.
Notoryctes typhlops, neurology of, 167.
Novapus *bidentatus*, 39; *nitidus*, 38.
Novius *discoidalis*, 253; *limbatus*, 254; *simplicipennis*, 253; *tripustulatus*, 254.
Obsidian bombs, 77.
Oleandridium *fluctuans*, 139.
Olivene basalts, 70, 71.
Onthophagus *Leai*, 31.
Orcus *Lecanii*, 239; *obscurus*, 240.
Orthoptera, on Australian species of, 19, 146.
Pachydissus *Frenchi*, 222.
Pachyura *minima*, 221.
Palaminus Novæ-Guineæ, 204; Vitiensis, 204.
Palmerstonia minor, 40.
Panesthia australis, 166.
Parandra *Frenchi*, 57.
Parasemus *cornes*, 212; *discoideus*, 211; *doctus*, 212; *internatus*, 213; *modestus*, 212; *obsoletus*, 213; *torridus*, 211.
Paratemnopteryx australis, 149; *blattoides*, 150; *Zietzii*, 20.
Parkhouse, T. A., on the Native Tongues about Port Darwin, 1.
Patellina Jonesi, 199.
Pegmatite, 75.
Penthoplophora Driffieldi, 23.
Periplaneta *Jungii*, 162; *parva*, 162; provisionalis, 161.
Periptyctus russulus, 234.
Petrographical observations, 70.
Phalacrinus *comis*, 215; *notabilis*, 214.
Philhydrus *eyrensis*, 29.
Phorticosomus grandis, 134.
Phyllodromia *liturata*, 150; *magna*, 19.
Plant-remains from Leigh Creek Coal-field, 138.
Platyomus *baccæformis*, 242; *consimilis*, 244; *cribratus*, 242; Eugeniæ, 244; *fulvohirtus*, 243; *immaculatus*, 243; Koebelei, 243; *obscuricollis*, 244; *terminalis*, 245.
Platyzosteria atrata, 158; bifida, 159; *Coolgardiensis*, 159; *maculimarginata*, 160.
Pogonus *hypharpagioides*, 126; *Zietzi*, 127.
Polyzosteria *subreflexa*, 158; viridicolor, 157.
Port Darwin, Native Tongues in neighborhood of, 1.
Praonetha *bimaculata*, 223.
Pseudoryctes *monstrosus*, 39; *trifidus*, 40.
Pterohelæus *fraternus*, 51.
Quedius *Koebelei*, 203.
Rhizobius Crotchi, 256; *discipennis*, 257; *eminens*, 257; *gosfordensis*, 257; *subaustralis*, 258.
Rhystisternus Arnheimensis, 133; *callabonnensis*, 132; *obtusus*, 129; *Stuarti*, 131.
Rhytiphora *Frenchi*, 225.
Scopodes *intricatus*, 202.
Scymnodes spp., 243.
Scymnus *ambulans*, 252; *brisbanensis*, 246; *Cowleyi*, 248; *ementitor*, 248; *impictus*, 247; *kamerungensis*, 249; *mareebensis*, 249; *mitior*, 251; *obumbratus*, 247; *operosus*, 246; *styx*, 249; *subclarus*, 250; *subevanidus*, 250; *Terræ-reginæ*, 247; *varipes*, 252; *yarrensis*, 252.
Semanopterus *carinatus*, *dentatus*, 43; *persimilis*, 42; *rectangulus*, 41.
Serangium *bicolor*, 255.
Sloane, T. G., notes on Carabidæ, 124.
Smith, Dr. G. E., Comparative Anatomy of the Cerebrum of Notoryctes typhlops, 167.
South Australian Muricidæ and Tritonidæ, 94; petrographical observations, 70.
Stenotarsus *arithmeticus*, 233; *commodus*, 233.
Syenite porphyry, 75.
Talaurinus *strangulatus*, 56.
Tæniopteris *fluctuans*, 139; *sp. ind.*, 140.
Tate, R., Correlation of Marine Tertiaries 108; Supplement to a Census of the Flora of extra-tropical S. Australia, 79.
Telmatophilus *breviformis*, 218; *cairnsensis*, 217; *Koebelei*, 217; *Sharpi*, 216; *singularis*, 218; *stygius*, 218.
Temnelytra *abbreviata*, *subtruncata*, 164.
Temnopteryx *ferruginea*, 148.
Tepper, J. G. O., on Australian Orthoptera, 19, 146.
Tertiaries of Australia, Correlation of, 108.
Thallis *dentipes*, 231; *femoralis*, 230; *Macleayi*, 228; *perplexa*, 228; *subvinula*, 229; *venustula*, 229.
Thyrsocera *australis*, 153.
Trechus atriceps, 28.
Tremolite schist, 78.
Trigonia *Murravica*, 262.
Tritonidæ of South Australia, 101.
Triton mimeticus, 88, et spp. 101.
Trophon *angustus*, 86; *levis*, 87; et spp. 97.
Trox Crotchi, 33; *strzeleckensis*, 33.
Typhocesis *adspersa*, 59.
Verco, Dr. J. C., New Species of Marine Mollusca, 84; A revision of the S. Australian Muricidæ and Tritonidæ, 94.
Wodongia lunata, 155.

VARDON & PRITCHARD, PRINTERS, GRESHAM STREET

UNIVERSITY OF ILLINOIS-URBANA
506SOU C003
TRANSACTIONS.
17-19 1893-95
3 0112 009772127